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COMPUTERWORLD

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Number-identification technology may be jeopardized by Pennsylvania court ruling that Caller ID invades privacy and violates wiretap laws. Page 6.

It was all a mistake, Stratus says, as it lays out used equipment recertification policy and blames some sales staffers for causing misconceptions. Page 125.

Patent-chaser firm loses first round in bid to force spreadsheet vendors to cough up royalties.
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Bailing out on its mainframe, American Airlines' crew- and flight-scheduling system is being redirected to a workstation and PC setup in a bid to stay atop an ever-changing flight itinerary. Page 43.

Enabling the blind to use the Macintosh interface puts Berkeley Systems among finalists for the *Computerworld Smithsonian Awards.* Page 17.

NEWSPAPER

Kapor's hacker aid plan ripped

BY JEAN S. BOZMAN
CW STAFF

CAMBRIDGE, Mass. — "Say it ain't so, Mitch!" summed up the stunned response last week to published reports that Mitch Kapor, founder of Lotus Development Corp. and On Technology, Inc., had offered to set up a legal defense fund for hackers targeted by federal investigators.

Kapor, through his secretary, confirmed a *Washington Post* story last week in which he revealed that he may pay the legal expenses of alleged hackers whose property was seized last month in a federal computer crime sweep called "Operation Sundevil" [CW, May 14].

"I don't think Mr. Kapor would be feeling too inclined to contribute to the defense of someone who had published his credit-card number on an electronic bulletin board," said Gail Thackeray, assistant attorney general in Arizona, who coordinated Operation Sundevil's fed-

Continued on page 123

Repository takes baby step

Little initial customer impact seen with early IBM AD/Cycle product

BY ROSEMARY HAMILTON
CW STAFF

The scheduled release of IBM's AD/Cycle Repository Manager this month will prove one thing above all: IBM is not kidding when it talks about the long-term nature of this strategic application development environment.

The debut of Repository Manager/MVS Version 1, Release 1, expected on June 19, will not offer much immediate functionality to end users, according to information systems managers, analysts and an IBM executive interviewed last week. Rather, it is more of a directional step that will bring users results later this year and next year.

AD/Cycle

"Customers who think they can roll this in and sit down and start developing applications have gotten the wrong message somehow," said Steve Uhlir, manager of platform architecture at IBM's AD/Cycle strategy and architecture group.

Repository Manager is critical to AD/Cycle because it has the job of managing information regarding applications and tool activity. Without it, the repository is little more than a DB2 database, which is its actual physical storage piece. Repository Manager is made up of two key pieces: a set of services for such functions as manipulation tool integration and the information model, which is the set of definitions and guidelines to ensure that applications are built according to AD/Cycle methods.

Depository Trust Co. in New York is committed to AD/Cycle and is planning to implement Repository Manager. Nonetheless, it would like to see more specifics.

"We have been told the Repository Manager will be extensible and that you can change its information model," said Emmanuel Ackerman, manager of data administration. "What we

Continued on page 125

Like father, like son: The IBM album

Already in business attire at age 13, *future IBM Chairman Thomas J. Watson Jr. (right) accompanies his father in photo taken in 1927. Watson met last week with* Computerworld *to discuss his new book and his views on IBM. Page 124.*

Numbers don't add up for users in phone bypass game

BY JOANIE M. WEXLER
CW STAFF

Despite reports that local telephone companies are losing hefty revenues to bypass activity, some users contend that sidestepping the local central office for communications needs is becoming less economical as carriers' prices and services grow more attractive.

"Handling the 'last mile' yourself has become a real hassle, often making bypass no longer cost-effective," said Stephen Frome, vice-president of operations and MIS at Stone & Thomas, a retailer based in West Virginia.

"There really are not very many people doing bypass," said Donna Jean Parker, vice-president for telecommunications at Macy's California, Inc. in San Francisco. "We [at Macy's] reassess the economics of bypass regularly, and each time, the numbers just don't play out."

Results of a recent study by Frost & Sullivan, Inc., a New York research firm, nonetheless show that local telephone companies are losing $3.8 billion per year in revenues to bypass.

The firm also predicted that user investments in bypass equipment and services will rise from $226 million per year in 1989 to an annual level of $422 million by 1993.

Continued on page 4

CIM opposites attract

BY ELISABETH HORWITT
CW STAFF

They make odd and sometimes quarrelsome bedfellows, but information systems and manufacturing and engineering departments are learning to work out their differences in the common interest of an effective computer-integrated manufacturing strategy.

Fifty-four out of 100 manufacturing and engineering managers surveyed recently by Advanced Manufacturing Research, Inc. said that their companies are either integrating or planning to integrate IS more fully with CIM efforts.

A major reason manufacturing managers have been inviting IS aboard their CIM project teams is that their companies are extending integration strategies beyond the shop floor to include all the functions involved in getting a product out the door, AMR said.

Gencorp, Inc. in Fairlawn, Ohio, for example, is currently trying to integrate its manufacturing division with the division that handles "distribution aspects such as sales, customer service, ordering and accounts receivable," according to Allen Wilkie, director of financial and

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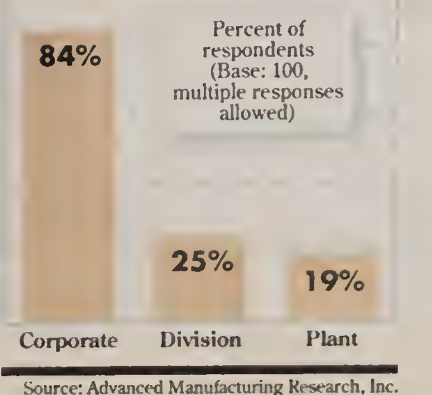
Top-down decisions
Manufacturing automation decisions are increasingly guided by corporate headquarters



Source: Advanced Manufacturing Research, Inc.
CW Chart: Marie Haines

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"Handling the 'last mile' yourself has become a real hassle, often making bypass no longer cost-effective."

STEPHEN FROME
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On sidestepping local phone companies for communications needs. See story page 1.

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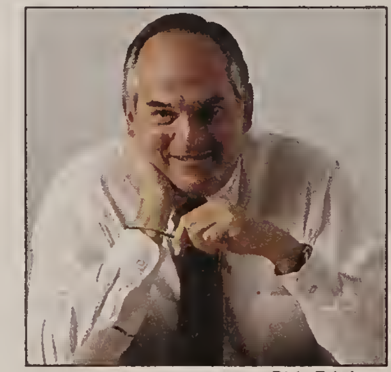
Fore! Nope, no more. Those of you drawn to the prospect of doing business on the golf links or tennis court are part of a minority of 'today's execs' — and a shrinking minority, at that. A recent survey by Accountemps of managers in Fortune 500-type organizations found the connection between participatory sports and business networking to be a loose one, at best. In fact, only 4% of those polled felt sports were important to business success. By our own calculations, that is roughly equal to the number of serious golfers in a typical office setting. Alas, modern conveniences such as E-mail are replacing afternoon soirees in the sun. Damn technology.



Rick Friedman

Systems integrators and you: an interview with CSC's Mel Bergstein. Page 72.

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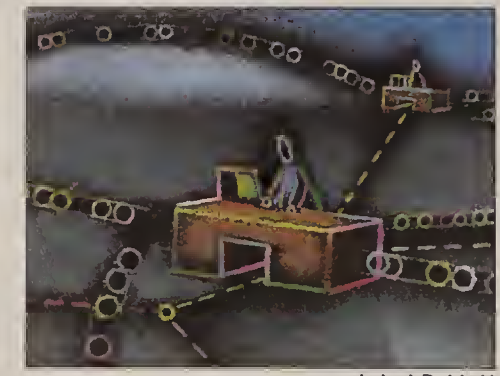


Andrzej Dudzinski

The PC landscape of 1995. Special Report begins after page 66.

EXECUTIVE BRIEFING

■ **Former IBM Chairman Thomas J. Watson Jr.** shares thoughts about his life and new autobiography in an exclusive *Computerworld* interview. Watson said he hopes the book depicts his father's genius and readers don't dwell on the vivid arguments the pair had over the years. Though he keeps an eye on IBM, Watson said he is content to stay out of current affairs and feels John Akers is doing "an excellent job." **Page 124.**

■ **It's not always a placid marriage,** but information systems and computer-integrated manufacturing efforts are finally coming together in U.S. industrial firms. More firms realize that manufacturing can't be an island of automation and IS leadership is needed to integrate shop-floor systems with order entry, distribution, sales, customer service and other functions. Some manufacturing managers, however, still criticize a glass-house mentality in IS departments more concerned with technology platforms than with the applications that run on them. **Page 1.**

■ **American Airlines' crew scheduling system** is making the flight from an IBM 3090 down to networked Mips workstations and Apple Macintoshes. American says the downsizing means much more flexibility to change schedules as well as savings of $1 million per year in processing costs. **Page 43.**

■ **New York Life will invest $10 million** in an imaging system and expects payback in 2½ years. The TRW Financial Systems technology runs on Unix-based Sun workstations. Separately, TRW is suing Unisys over alleged infringement of its imaging technology patents. **Page 8.**

■ **Mobil and Bankamerica will each change IS bosses** within the next month. Bankamerica tapped Paine Webber CIO Martin Stein to replace Michael Simmons, while Mobil stayed inside and named assistant controller Peter Van Zyl. The current Mobil IS chief, Jerome Trautschold, was promoted to a divisional CFO. **Page 7.**

■ **While Gorbachev meets with Bush,** U.S. vendors are still struggling with the challenge of selling computers in the Soviet Union. DOS-based systems are popular, Unix is not, and the only Mac getting much attention is the the Bolshoi Mac at the Red Square McDonald's. **Conclusion of a two-part series, pages 95, 99 and 103.**

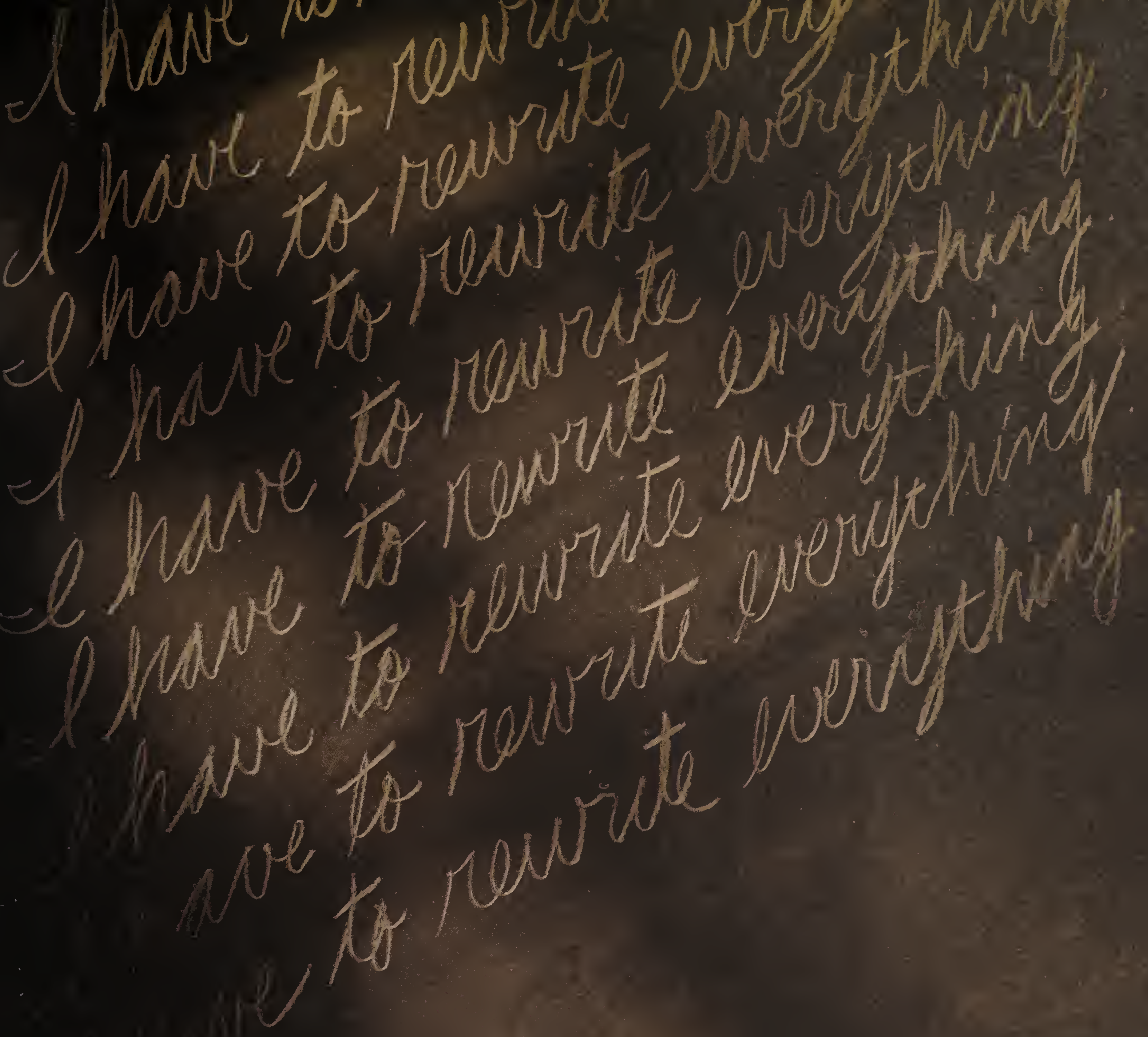
■ **Gorbachev's trip to Minnesota** poses a massive information-handling challenge to state officials. Northwest Airlines and Honeywell joined the *glasnost* spirit in a joint venture with the Soviets for a satellite-based aircraft navigation system. **Page 12.**

■ **Users are faring better in legal action** against computer vendors, according to lawyers and recent cases. In addition, more user/vendor grievances are being settled out of court. **Page 89.**

■ **As PC vendors and users ride a collision course** into the next five years, countless questions remain unanswered. What is the future of laptops? What will be the impact of multimedia? How will work-group computing affect the business? **Special Report.**

■ **Training departments can "prove" they're saving money** by substituting cut-rate in-house classes for training vendors. These calculations, however, can obscure the true cost of in-house training and divert attention from issues more critical than cost. **Page 121.**

■ **On-site this week:** Summer's near, but things remain cool inside Delmarva Power & Light's new $11 million data center in Newark, Del. The power company serves as a model for energy conservation with new data center chilling technology that cuts peak demand by an estimated 100 kilowatts. **Page 29.**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Businessland pitches PC help

BY RICHARD PASTORE
CW STAFF

SAN JOSE, Calif. — Businessland, Inc. last week dangled a new, consolidated multivendor support line in front of personal computer users. Although the cost of such outside support repels many, the growing complexity of managing multivendor platforms will force more users to take the bait, analysts said.

"More companies will start to have trouble dealing with all the hardware and software platforms; they'll need to buy some outside expertise," said Paul Zagaeski, an analyst at The Yankee Group in Boston.

Businessland is hoping users will buy that expertise by dialing its Solution Line Plus, an amalgam of previously separate Help lines for software, hardware and local-area network questions. The service provides technical support for 160 products sold through the retail chain. Computerland, Inc.'s comparable service, established one year ago, offers support for only 40 products.

Calls to Solution Line Plus cost users from $30 to $38 apiece. If on-site service is required, Help-desk staffers dispatch technicians who will charge $180 to $228 per hour.

Several users blanched at these fees, saying their own in-house support is more economical. "That's pretty steep," said Stuart Denrich, MIS director at Valu Food, Inc. in Baltimore. In comparison, "you can buy a year's support from Lotus for $159," he said.

"We would not be interested in that," said Russ Johnson, a supervisor in pricing administration at R. R. Donnelly & Sons Co. He added that end users tend to overuse such Help-desk lines, running up needless charges for questions that could be answered with the manual.

The Chicago-based printer has been on both sides of the support fence. It once contracted its PC service from IBM but found the company to be "too expensive and unresponsive," Johnson said. "Sometimes their solution was 'Send it here, and in a week, we'll get it back to you.' " In-house support seemed a better alternative.

New York Life Insurance Co.'s sales department thought differently. It chose to use the Businessland support line because, "We're in the insurance business, not the MIS business," said Robert McLoughlin, assistant vice-president in charge of microcomputer procurement, training and support.

Supporting multiple PC platforms and applications proved too expensive and logistically difficult for the company to handle in-house. The firm's 10,000 sales agents now place 50 to 75 calls per day to the Businessland line.

Even paying Businessland's prices, McLoughlin said he is saving money over in-house support. Instead of training and maintaining a support staff of 11, the sales group was able to "transfer our resources in support to insurance-specific projects," he said.

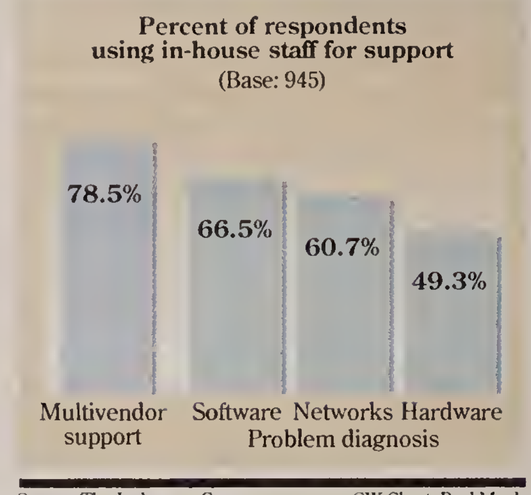
"We've had extremely good results; our people get answers and quickly get back to work," McLoughlin said, noting that the service has allowed him to contain overhead and cut staffing costs.

Even in-house advocates such as R. R. Donnelly are having doubts about their ability to maintain support in the future. Complicated applications require customized PC configuration. "So, you have to spend a lot of time figuring out how the user set up his machine — it's getting to be a pain," Johnson said.

There is no surefire way to determine whether a company would save more with in-house or outside support, but analysts pointed out several factors worth examining. It makes more fiscal sense to have a single source of support, such as Businessland, if a firm has multiple PC platforms and applications, complex network setups and users who are not very familiar with computers.

Company size and geographic distribution in some cases also add to the advantage of single-source outside support.

Support staff
Support for PC users is mainly provided by in-house staff



Source: The Ledgeway Group CW Chart: Paul Mock

Bypass

FROM PAGE 1

Bell Atlantic Corp.'s yearly bypass report to the Federal Communications Commission reflects $724 million lost in revenue to bypass in 1989; Bellsouth Corp.'s report cites about $215.3 million in lost revenue.

Part of the discrepancy between research figures and user observations could lie in conflicting definitions of bypass. For example, the local telephone companies tend to broadly define bypass as any activity that competes with their offerings.

"There's a fallacy to the bypass issue," said Thomas Nolle, president of CIMI Data Corp., a research firm in Haddonfield, N.J. "The majority of traffic bypassed was never intended to go through the local exchange anyway. For example, is a local-area network a form of bypass?"

Kent Edwards, Bell Atlantic's director of rate development, acknowledged that LANs do figure into his FCC bypass reports.

A study of 500 large U.S.-based organizations recently released by TFS, Inc.'s Comm/Surv research division determined that more than 26% were currently bypassing the local phone company and nearly 4% plan to do so. The poll did determine, however, that while bypass traffic among currently bypassing companies is on the rise, the rate of companies entering the bypass arena is slowing. In fact, Bellsouth's current bypass report identifies 23 out of 27 bypassing companies in its region as having initiated the activity in 1987 or earlier.

A bit of competition at the local level could be one reason fewer firms are getting into bypass today. Parker noted that local pricing is "the best we've ever had it" because of competition to Pacific Bell from Bay Area Teleport and Teleport Communications California.

Robert Atkinson, vice-president of Teleport Communications Group, the holding company for Teleport California and its counterparts in New York and other states, noted that Teleport's dedicated fiber and microwave metropolitan-area networks are usually "complementary" to phone company offerings.

He explained that many companies use his service alongside those of the phone company for disaster backup, adding that Teleport poses no competition in the switched area at all.

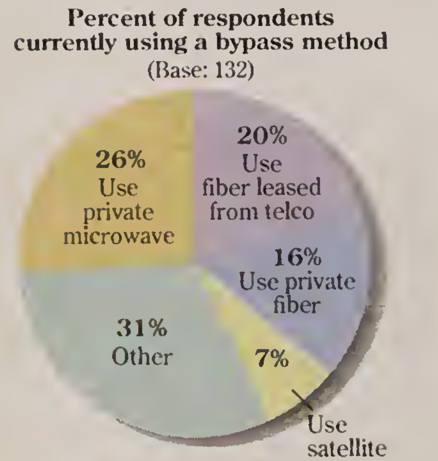
Users concede that bypass is economical in some cases, depending on such factors as geography. Bob Hynes, telecommunications engineering manager at the *The Los Angeles Times*, said: "We have offices across the street from each other, so we just run our own wire for direct service between offices."

One facilities bypasser, Automated Data Processing, Inc., in Roseland, N.J., is saving 50% on access charges by running a T1 link directly to U.S. Sprint Communications Co.'s central office, said Joe Gallo, senior director of corporate telecommunications.

Even bypass-skeptical Frome is engaged in the ultimate form of bypass, circumventing both the local-exchange and interexchange carrier with two rooftop-to-rooftop satellite links at opposite ends of West Virginia — a setup he determined would save him $1,000 per month.

But while users must continually reassess the bypass option, many corporations are discovering that they no longer want to be their own telephone companies if they do not have to. As Frome put it, "You have to be pretty savvy technically to properly manage your own access."

Sidestepping the issue
Businesses are pursuing diverse methods of bypassing their local telephone companies



Source: TFS, Inc. CW Chart: Paul Mock

CORRECTIONS

The May 21 issue of *Computerworld* contained a product announcement from Hanzon Data, Inc. The company went out of business a short time prior to the publication of the announcement.

The story "Relational performances scrutinized at DB Expo" [CW, April 2], about DB Expo '90, which took place in San Francisco March 27-29, should have indicated that a previous generation of TP1 benchmarks was faulted by vendors and analysts for being too limited. The TP1 benchmarks, which measure transaction rates for simple debit/credit transactions, preceded the new group of TPC benchmarks, which measure complex transactions. TPC benchmarks, which were finalized in January, are based on a standard created by the California-based Transaction Processing Council.

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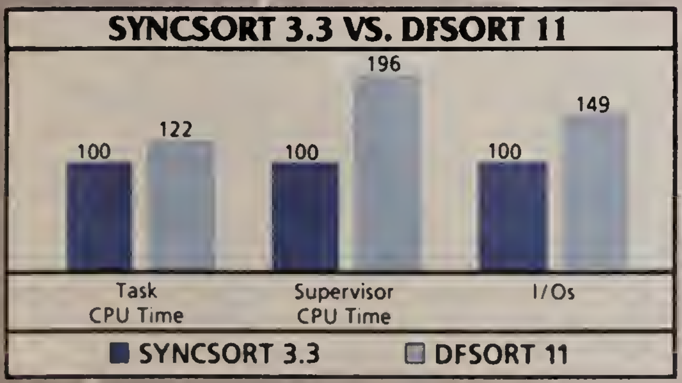

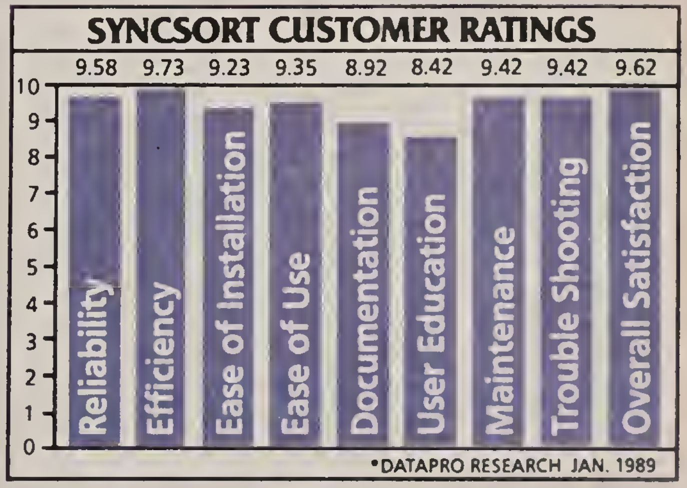

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NEWS SHORTS

Commerce takes point position

The U.S. Department of Commerce said last week it will represent U.S. industry in responding to a controversial Japanese proposal to establish an international consortium to develop advanced manufacturing techniques. Japan's Ministry of International Trade and Industry (MITI) had proposed a $1 billion partnership with U.S. and European companies. Critics charged it was a ploy to unfairly gain U.S. technology. The department has now effectively blocked direct agreements between MITI and U.S. companies by insisting that it approve the terms of cooperation, rights to intellectual property, funding arrangements and the technical areas to be pursued.

……

Nynex indicted for contempt

A federal grand jury in Washington indicted Nynex Corp. last week on one count of criminal contempt for knowingly providing information services in violation of the consent decree that broke up AT&T. The charge is based on the 1986 acquisition by Nynex of Telco Research Corp., a Tennessee-based software company. Telco had previously provided information services to MCI Communications Corp. and has continued to do so in violation of the law, the grand jury said. Nynex denied the allegation and said it has worked with the U.S. Department of Justice to ensure that Telco activities are in compliance with the consent decree.

……

New Net/Master release this week

Systems Center, Inc. and Software Developments International Pty. Ltd. are expected to announce the long-awaited Net/Master Release 2.2 at the Systems Center users group meeting in Dallas this week — the day after they expect to complete their merger. Key enhancements, according to SDI managing director John Robinson, include support of IBM's LU6.2 peer-to-peer protocol as a means for third-party networking products to link up with Net/Master and support of SQL-based databases, including IBM DB2.

……

Patent examination accelerated

The Willemijn Holding B.V., which administers the patent for token-ring technology held by inventor Olof Soderblom, announced last week that in an effort to expedite proceedings, it would not exercise its right to file an objection to a patent reexamination initiated last month in the U.S. Patent and Trademark Office by an anonymous party. In related activity, Soderblom is currently suing Madge Networks, a UK-based token-ring company, for patent infringement, while Madge is countersuing to have the patent declared invalid.

……

Windows gets first word

Bowing to pressure from the swelling tide of interest in Microsoft Corp.'s Windows Version 3.0, Wordperfect Corp. last week reversed its shipment schedule for planned upgrades to its Wordperfect word processor. In late April, Wordperfect's Executive Vice-President Pete Peterson said beta testing for the OS/2 Presentation Manager version would be completed by November, followed by release of a Windows version in the first half of 1991. Now, Wordperfect is saying it will push up the Windows release date by three to four months and hold back the Presentation Manager release by four to five months. Based on those estimates, it is possible that the Windows product will not ship until early next year, followed by the Presentation Manager version in spring 1991.

……

Soviets PS/2 it

Schoolchildren in the Soviet Union will soon be the recipients of more than 13,000 IBM Personal Computers. Michael Armstrong, chairman of the IBM World Trade Corp., said last week that the company will begin shipments to the USSR this September, just as schools begin the 1990-91 school year. The program may be extended over time to include more schools and could form the basis for the buildup of assembly operations for PCs in the Soviet Union, according to IBM.

More news shorts on page 123

Ruling clouds Caller ID service

BY MITCH BETTS
CW STAFF

HARRISBURG, Pa. — Last week's Pennsylvania court ruling against local Caller ID service is expected to have a ripple effect across the country and may even jeopardize the similar number-identification technology used by corporate customer-service departments.

The state appeals court prohibited Bell Atlantic Corp. from offering any form of the controversial Caller ID service in Pennsylvania on the grounds that it violates the state's wiretap law and constitutes a "grave" invasion of the caller's privacy.

Bell of Pennsylvania, the affected unit of Bell Atlantic, said it was "extremely disappointed" with the hard-line ruling and is considering an appeal to the Pennsylvania Supreme Court. Caller ID is a Centrex service that allows subscribers to see — on a digital readout device — the telephone number of the caller.

Although the decision focused on Caller ID, which is aimed primarily at residential and small-business customers, the same legal principles could apply to a business that uses automatic number identification in a computer-integrated telecommunications system [CW, Feb. 5]. Automatic number identification, a feature of Integrated Services Digital Network, is typically used by customer service departments to identify incoming calls and automatically retrieve customers' records.

Marc Rotenberg, spokesman for Computer Professionals for Social Responsibility, said it appears that the Pennsylvania ruling would apply to automatic number identification systems. If so, automatic number identification users in that state are vulnerable to court suits, he said.

Precedent-setter

The dramatic ruling is expected to prod other states to take a hard look at whether Caller ID should be implemented. In addition, the U.S. Senate Subcommittee on Technology and the Law is scheduled to hold a hearing on Caller ID this week.

The Senate subcommittee is studying a bill, sponsored by Sen. Herbert Kohl (D-Wis.), that would require telephone companies to give callers the option of blocking the display of their phone numbers. Kohl's bill "now looks a lot more moderate after the Pennsylvania ruling," Rotenberg said.

By ruling that Caller ID is illegal with or without blocking, the Pennsylvania Commonwealth Court went further than the service's opponents had requested.

Bell of Pennsylvania argued that Caller ID allows subscribers to screen incoming calls and thus reduce unwanted, harassing, threatening or obscene calls. However, the court ruled that the right to make calls anonymously from a home telephone outweighs the need to protect people from annoying calls, which can be handled through other telephone company services.

The court cited previous court opinions that the caller's number should be just as private as the message content. "In the framework of a democratic society, the privacy rights concept is much too fundamental to be compromised or abridged by permitting Caller ID," according to the opinion written by Judge Doris A. Smith.

Furthermore, the court said that Caller ID violates the state's antiwiretapping law because it constitutes a "trap and trace device" that intercepts the calling party's phone number for electronic surveillance.

Unix standard rivals put on competitive face

BY TIM GRANTHAM
SPECIAL TO CW

OSF's Tory *touts competition as useful for Unix market*

TORONTO — In their first public appearance together since merger negotiations broke up, the chief executive officers of Unix International and the Open Software Foundation (OSF) attempted last week to allay user fears that their competition would slow the growth of the open systems market.

"The last thing we want to happen in the industry is that end users get turned off because of a competitive situation that gets blown up out of all proportion by the media," Unix International President Peter Cunningham said at Uniforum Canada's Unix '90 conference.

Cunningham pointed out that OSF and Unix International have agreed to work on a common framework for a test suite to verify that both products are in compliance with X/Open Consortium standards. He said that they are also working together on standards for internationalization and on an application programming interface for symmetric multiprocessing.

OSF President David Tory, while agreeing that the two groups would continue to cooperate on meeting industry standards for their offerings, said the competition would be good for the industry. "Between us, we are driving, through competitive innovation, the whole open systems movement forward as fast as we can," he said.

Cunningham's view of the competitive environment was a little different.

"The point here is Unix and open systems vs. the potential growth of an operating system like OS/2," he said. "If the Unix world cannot get its act together to move forward in a compatible fashion, then users are going to vote by making that transition from DOS, onward to OS/2 and up through the server marketplace until we have a situation once more where one organization dictates and controls the open systems evolution."

Sun Microsystems, Inc. President Scott McNealy blasted as "a totally political decision" a recent OSF decision that eliminates Sun's Network File System from OSF-endorsed communications protocols. "OSF is dedicated to slowing down Unix," he charged.

Dan Perley, acting director of intermediate informatics for federal ministry Transport Canada and a conference attendee, expressed misgivings about the dual standards boards. "They're cooperating on some standards but not on others," he said. "Competition among vendors is healthy; competition among standards is definitely not."

Transport Canada is testing Unix systems from five vendors at installations across the country. Perley said that most information systems managers at large public and private organizations would like to see a merger between Unix International and OSF occur rapidly. "We are going to be able to cope with the duality of Unix, but only because we've developed a special strategy for doing so," he said.

Grantham is a Toronto-based free-lance writer.

Mobil, Bankamerica poised to shift CIO gears

BY CLINTON WILDER
CW STAFF

NEW YORK — Mobil Corp. will change its top information systems position next month but will continue its pattern of placing financial executives in charge of IS.

The financial industry will also see a major executive shift later this month when Martin Stein, chief information officer and executive vice-president at Paine Webber, Inc., takes over Bankamerica Corp.'s high-visibility and apparently high-risk IS leadership. He will be the bank's fourth IS head in seven years.

Mobil's assistant controller, Peter Van Zyl, will replace Jerome F. Trautschold Jr. on July 1 as general manager for systems and computer services. Trautschold will return to a financial position as chief financial officer of Mobil's marketing and refining division.

A Mobil spokesman declined to comment on the reasons for the change at the $50 billion oil giant. Trautschold worked in Mobil's treasury department before moving to IS eight years ago.

Mobil, No. 6 on the Fortune 500, has an estimated annual IS budget of $670 million. It was rated the fourth-most effective user of IS in the petroleum industry by the 1989 *Computerworld* Premier 100.

Mobil is the third major oil company to change its top IS executive in the past nine months, following Chevron Corp. and Shell Oil Co. [CW, Oct. 2, 1989]. Like Trautschold, former Chevron IS chief Martin Klitten moved to a top financial job.

At Bankamerica, Stein will replace Michael Simmons, who resigned unexpectedly two months ago for the top IS post at Bank of Boston. "It's the only job in the world that would make me leave" Paine Webber, Stein said. He has been Paine Webber's CIO for five years.

Kent Hanson

Mobil's Trautschold: *Back to finance*

AT&T, Retix plan Unix/OSI blend

BY JOANIE M. WEXLER
CW STAFF

NEW YORK — AT&T's Unix Software Operation and Retix exuded an air of having mortared another brick in the foundation of open systems last week when they announced plans to integrate AT&T's Unix System V operating system with Retix's Open Systems Interconnect (OSI)-based software.

In the way of direct user benefits of the alliance, however, Retix President Steve Frankel mainly touted the symbolism behind AT&T's sanctioning user moves to OSI standards. "Having a major player like AT&T say that OSI networking is the choice for the 1990s should encourage . . . end users that the time is now ripe for OSI," Frankel said.

While AT&T is undeniably a major Unix force, the company's blessing to get the OSI ball rolling is overshadowed by the federal government's mandate that all government agency equipment procurements conform to OSI standards, effective Aug. 1, 1990. Another impetus for OSI migration is the proliferation of the X.400 messaging standard, as companies are discovering the strategic merits of enterprisewide electronic mail.

"I'm in favor of whatever the vendors can do to integrate X.400 into anything," said Peter Donaghy, a manager in the corporate communications and data processing division of Hughes Aircraft Co., a large user of X.400 for interenterprise communications. "These relationships spare us from spending our time and energy on interconnection so we can concentrate on our applications."

Another useful aspect of the joint development and marketing arrangement is the planned provision of Transmission Control Protocol/Internet Protocol (TCP/IP)-to-OSI gateways, which will be available along with the other integrated Unix/OSI software in the first quarter of 1991. The initial application-layer communications protocols to be integrated are X.400 for E-mail, X.500 for directory services, Virtual Terminal for remote terminal emulation, Common Management Information Services and File, Transfer, Access and Management.

The gateways will help TCP/IP users migrate to OSI by converting TCP/IP — a communications protocol largely used with Unix — to OSI protocols.

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Leader of the insurance pack

New York Life among first to invest heavily in imaging to speed processing

BY MICHAEL SULLIVAN-TRAINOR
CW STAFF

In a bid to be one of the first insurance companies to take advantage of a large-scale image-processing application, New York Life Insurance Co. is investing more than $10 million in a Unix and Sun Microsystems, Inc.-based imaging system.

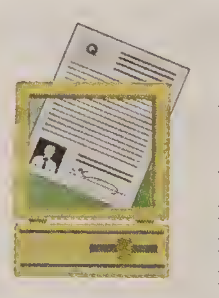
The system, developed by integrator TRW Financial Systems, Inc., will be installed in the fourth quarter of 1991. It will allow the nation's sixth-largest life insurance company to consolidate processing of new business applications, now done in 181 offices, to two locations — one in Dallas and one in the New York home office.

"We expect the system to pay for itself in 2½ years," said John Foy, senior vice-president of individual policy services. "It will allow us to process most new insurance applications faster."

Of the 1,300 employees in the offices involved, 200 will be directly affected, most of them in the data entry area. "Many employees will be given new missions, and there will be some attrition," Foy said.

A total of 180 IBM-compatible Intel Corp. 80386-based personal computers will be installed. The systems will run Microsoft Corp.'s Windows and MS-DOS and will be connected via an Ethernet local-area network. The systems will also be linked to two as-yet-unspecified Sun servers running Unix.

"We chose DOS because we know it works, while OS/2 is not where we want it to be yet," said James Coffee, assistant vice-president and project director.



"It's a step away from the norm. In the past, we've always been an IBM shop. It's also a first step to a distributed system," added Elaine Nowacki, applications project director.

IBM, Digital Equipment Corp. and Wang Laboratories, Inc. were also considered for the project, which began with initial studies more than two years ago. While TRW is implementing the workstations and servers, New York Life's information systems group will build interfaces from the Sun systems to four mainframe applications: policy printing, new business, accounting and check writing.

The IS team is composed of eight programmer/analysts and backed by New York Life's systems and network support groups. Nowacki estimated it will take 205 man-months to complete the interfaces, installation and testing.

Primary users of the system will be 70 underwriters, company doctors and customer service staff. They will use imaging to process new insurance applications more quickly and thus generate more business for New York Life, according to Coffee. The system will speed up access to source documents from hours or days to immediate access. It will also allow instant referral of applications between underwriters and doctors. Once the application is scanned into the system, all the underwriters work will be done via image, eliminating the need for paper files.

New York Life's IS department plans to use this implementation as a showcase of what imaging can do to enhance effectiveness. "We're already looking for opportunities in other areas of the company," Nowacki said.

TRW imaging unit pursues Unisys suit

BERKELEY, Calif. — TRW Financial Systems, Inc. is taking Unisys Corp. to court, claiming Unisys has infringed on its imaging-processing patent.

The suit, filed in U.S. District Court in Detroit on May 4, charges that Unisys is using technology in TRW's broad, decade-old Document Processing System and Method patent, which has been licensed by several companies, including Eastman Kodak Co. and IBM.

The patent, which TRW gained when it acquired Teknekron Financial Systems in 1986, covers a method of capturing check images and data by passing paper checks through a read sorter and a video camera and subsequently storing these images on optical disc.

Unisys said it was reviewing the suit, but that it believes "no Unisys product will be found to infringe any valid claim of patent." Unisys added that its contracts with customers protect them from indemnity.

About a dozen banking customers are currently installing the Unisys imaging system, called the Infoimage Image Item Processing System , which was announced last October. One customer, who asked for anonymity, said the installation will continue while Unisys and TRW settle their dispute.

"Obviously, [the suit] could present a major hurdle for Unisys," said Mike Howard, program director of office information systems at Gartner Group, Inc. in Stamford, Conn.

Howard noted that imaging applications require considerable up-front work and have long lead times for each sale.

Novell omits icing on cake for prompt 3.1 delivery

BY JIM NASH
CW STAFF

Admitting that it had bitten off more than it could chew, Novell, Inc. said last week it will produce a pared-down Version 3.1 of its Netware 386 operating system.

The Provo, Utah-based networking company said it was forced to shed four major features once pegged to Version 3.1 in order to avoid new delays. Announced one year ago, Version 3.1 was originally due in the first quarter of this year. Novell executives last week said it will be next month before it is delivered.

Information systems professionals contacted about the Netware announcement said the omissions are disturbing but not critical. In fact, some users expressed relief, saying that Version 3.1 would be acceptable in almost any form as long as it ended the numerous patch jobs that the previous version required.

According to Mark Calkins, Novell's marketing vice-president for Netware products, the four major features axed were an extended file system interface, faster performance over remote bridges, enhanced network security and built-in support for Apple Computer, Inc.'s Appletalk.

Remote network management and the Novell naming service initially promised have experienced delays, Calkins said, and should be available sometime next quarter. Support for 1,000-workstation networks will not now be a part of the Version 3.1 package.

Christopher Incao, a senior analyst at Reliance Insurance Co. in Philadelphia, said that Novell is moving slowly to help Fortune 500 companies manage their networks. A remote console service that will be retained comes closest to targeting large and wide-area networks.

Incao said he found it disturbing that Novell could not find the resources to throw at enhanced network security. Calkins said only portions of enhanced security made the cut; encryption for backup files did not. Incao said that Reliance still runs Netware 286 and will continue to do so until convinced that the bugs have been worked out of 386.

An IS manager for an East Coast power company, who also intends to hold off upgrading for now, said he, too, had put plans to pick up 386 on hold until the bugs were worked out of Version 3.0. The manager said he chalked up much of Novell's 3.1 talk last year to overly ambitious marketing.

CIM

FROM PAGE 1

planning systems. In such projects, IS is not only welcome but crucial, some manufacturers are finding. Gary Rolfe, an automation systems designer at Ingersoll-Rand Co.'s Athens, Pa., plant said manufacturing and engineering departments have come to the conclusion that "we have to work with the systems group" to tie together the "islands of automation" developed relatively independently.

Effective cooperation has not happened overnight, however, according to Tom Streeter, who is systems manager at the plant. While the plant has had a CIM team in place for more than a year, it was not until "four to six months ago" that IS got "involved from day one" in new CIM initiatives, Streeter said.

IS had to work hard to convince the CIM project leaders "to get us involved up front," Streeter said. "They would tend to go off on their own and then come to us in the end" with proposed implementation plans. The result was often confrontation, as Streeter's people raised objections on the grounds of technical feasibility. "And that's where we sometimes come out the bad guys, because we can't allow that mishmash out there if we can't support it," he said.

Speaking from the manufacturing side of the plant, Rolfe complained that IS in its glass house is "too far away from the user community and tends to be more concerned about the platforms and architectures [applications] run on than what people use them for."

However, even while continuing to snipe at each other, the two sides agreed on the importance and effectiveness of putting together project teams that allow them — as well as users — to air grievances before they become too serious.

Kraft, Inc., in Glenview, Ill., for example, has created joint project teams that include "key people in IS, manufacturing-engineering and operations, and all our project teams are made up of both users and technical folks," said Jim Gage, director of plant integration.

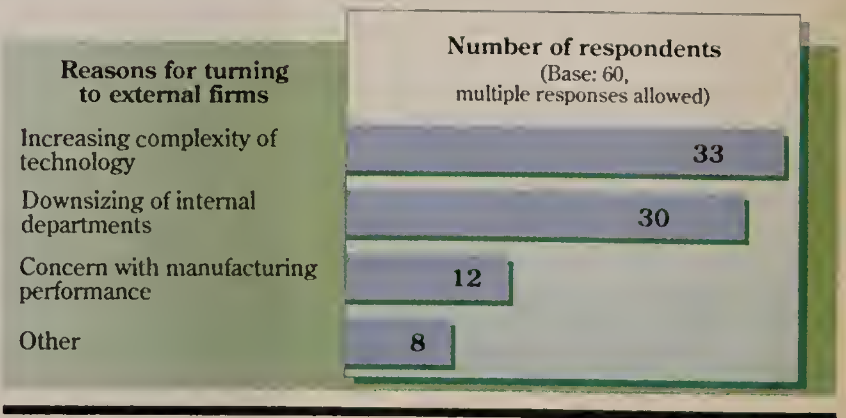
One major source of friction that project teams can help resolve is the fact that IS managers may not go along with all of the team's CIM goals. In particular, sources reported, IS managers tend to be threatened by integration tactics that distribute computing power to user groups.

When Gencorp proposed to downsize a number of mainframe programs to personal computers and local-area networks, some IS managers claimed said "it was much more efficient for them to manage things in an air-conditioned room with a big box," Wilkie said. Gencorp has also taken away IS managers' "control over the creation of reports," by giving users direct access to corporate systems, he said.

Meanwhile, the CIM project team at Ingersoll's plant is thrashing out the question of how much access users should have to corporate databases and applications. Manufacturing users have been complaining that IS takes too long to fill special requests for reports, Rolfe said.

Overload

Technology and organizational issues are causing manufacturers to seek outside help to meet integration needs



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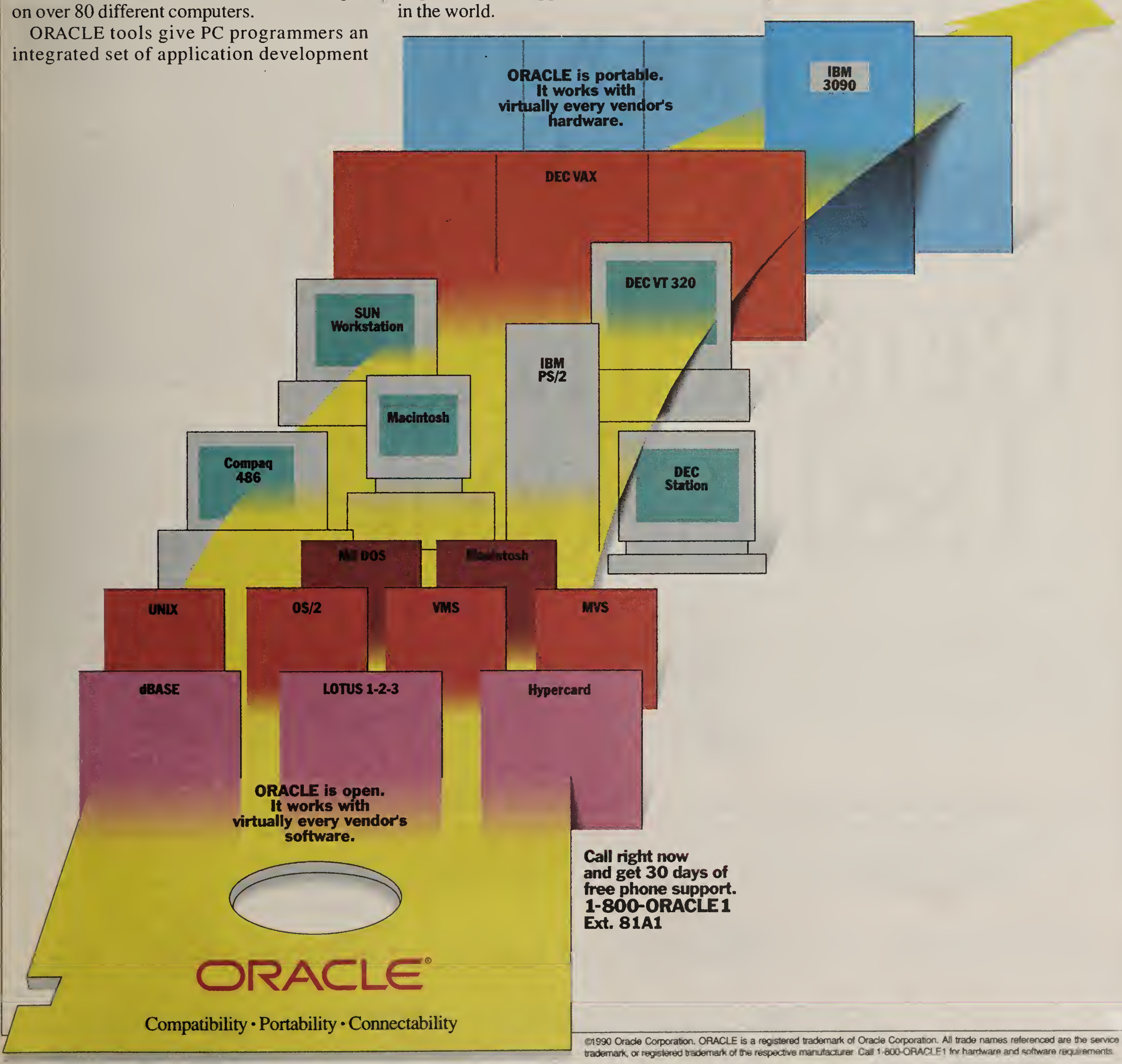
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DEC sharpens tools for foray in EDI

BY MAURA J. HARRINGTON
CW STAFF

BOSTON — In an effort to cut into the electronic data interchange (EDI) services market, Digital Equipment Corp. introduced its DEC/EDI software last week and also gathered up several third-party vendors to voice their support for DEC's enhanced EDI and document management programs.

DEC/EDI, a component of DEC's Network Architecture Support system, was designed to allow users to electronically exchange structured business documents using a variety of EDI standards and to track and manage the documents being sent and received over Decnet system, according to William Carlisle, DEC's EDI marketing manager.

Some of the features of DEC/EDI include the ability to link structured business documents with DEC's electronic-mail messages to send them over EDI together; the ability to translate the document into several different syntaxes; and the choice of communications servers such as X.400, CCITT X.25, bisynchronous communications and export/import communications options, Carlisle said.

"The purpose of DEC/EDI is to track the movement and management of structured business documents over a variety of different EDI standards," Carlisle said.

"This announcement, coupled with some of its other transaction processing announcements over the past year, means you have to consider DEC as a viable contender in the EDI market," said Jim Hammons, an analyst at The Sierra Group, Inc., a market research firm based in Tempe, Ariz.

While IBM may be better known for its EDI services, which it announced in April 1989, DEC will be offering a wider variety of third-party solutions in a more economical manner, Hammons said.

DEC/EDI will also be supported by AT&T, General Electric Information Services, BT Tymnet Value-Added Network Services and MCI International, Inc. for translation, according to Howard Woolf, DEC's manager of EDI and Compound Document Architecture programs.

A different tack

IBM takes a different approach toward translation of its documents by using its own proprietary information network to translate and transmit documents, said Lisa Mandell, manager of EDI solutions at IBM.

While the company did not introduce any products for its Document Management Program, analysts nevertheless hailed DEC for its ability to gain so much third-party support for the Compound Document Architecture strategy.

"DEC's ultimate goal here is to add some real value to their strengths in networking, and the third-party support that they have received for this program is not something to be overlooked," said Robert Herwick, an analyst at San Francisco-based Hambrecht & Quist, Inc.

Some of the companies that have agreed to support DEC's Compound Document Architecture program include Odesta Corp., Verity, Inc., Excalibur Technologies, Inc., Information Dimensions, Inc. and others, according to Henry Ancona, DEC's vice-president of information systems and applications.

In other efforts to gain ground as a systems integrator to its customers, DEC named Coopers & Lybrand and Price Waterhouse, both New York-based consulting firms, as two outside consultants that are qualified to aid in consulting its customers on EDI, according to Russell Gullotti, DEC's vice-president of enterprise integration services.

DEC/EDI, due out in September, runs on all DEC VAX computers. Pricing starts at $12,276 for the DEC/EDI application server, translation server, communications server and media and documentation.

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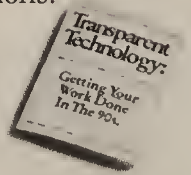
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Minnesota scrambles to make Gorbachev visit successful

BY ELLIS BOOKER
CW STAFF

MINNEAPOLIS — A planned six-hour visit by Soviet President Mikhail Gorbachev sent shivers through the Minnesota state government and high-technology firms.

The Minnesota State Department of Administration last week was putting the finishing touches on a quickly created database to handle the crush of reporters covering Gorbachev's day-long visit. Meanwhile, the region's high-tech companies hoped the visit would further U.S./Soviet trade relations.

Minnesota Commissioner of Administration Sandra J. Hale said the system was assembled to handle the "credentializing" of press personnel for the U.S. Secret Service. Information on more than 1,100 press representatives had been entered into the database by late last week, Hale said.

Ameridata, Inc., a Minneapolis-based systems integrator that has a five-year information technologies contract with the state, set up the local-area network in one day.

Within 24 hours, an application written in Oracle Systems Corp.'s SQL Forms and SQL Reportwriter for the Oracle OS/2 Server had been coded, tested and installed on the four-station LAN. The network comprised four IBM Personal System/2s, a Compaq Computer Corp. 386 server running Novell, Inc. Netware and an IBM PS/2 Model 80 Oracle database server.

Ameridata, one of 60 LAN resellers that are part of a preferred systems integrator sales program announced by Oracle last month, worked jointly with Oracle personnel on the project.

Under the direction of the Secret Service, Hale's department collected and input press information into the database. A variety of reports were then faxed to the Secret Service, which made final security checks on the press attendees.

Meanwhile, Control Data Corp. (CDC) was also expecting a visit by the Soviet president to its headquarters.

CDC, which has a 20-year history of trade with the Soviet Union and claims that six of its Cyber systems are already in operation in the USSR, said it is close to concluding a $32 million sale of several Cyber 6960 mainframes to the Soviet Union.

Western muscle

The Cybers, which will be used for safety analysis of civilian nuclear power plants, will be the most powerful computers ever sent by the West to the Soviet Union, according to a CDC spokesman. The sale was pending U.S. Government approval of safety controls as well as approval from the Coordinating Committee on Multilateral Export Controls (Cocom). CDC is awaiting final Cocom approval for another Soviet sale: a $6 million contract for some older Cyber 180 mainframes to be used by the Soviets for petroleum exploration research.

In addition, CDC said last week it had received a request from Czechoslovakia to upgrade that nation's Cyber 816 to an 825 for use in its upcoming national elections.

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MINNEAPOLIS — In a high-flying example of improving U.S. and Soviet trade relations and technical cooperation, Honeywell, Inc., Northwest Airlines and a group of Soviet scientific and aviation agencies said last week that they will jointly develop a satellite-based navigational and aircraft positioning system.

Honeywell and Northwest, both headquartered here, made the announcement prior to Soviet President Mikhail Gorbachev's scheduled visit to Minneapolis yesterday.

Honeywell said it had become the first U.S. company with rights to develop *Glonass*, the Soviet satellite positioning system, for commercial aviation. Northwest will become the first Western airline to test the system, which could eventually eliminate ground-based equipment in tracking the location of aircraft in flight.

The system will reportedly provide extremely accurate positioning information under all weather conditions anywhere on or near the surface of the Earth, as well as cover ocean areas not now served by terrestrial navigational aids.

Under details of the five-year Memorandum of Understanding signed by Honeywell, Northwest and the Soviets, *Glonass* equipment — including "black boxes," software and antennas — will be delivered to Honeywell and Northwest in December. The equipment will be mounted aboard a Northwest 747 all-cargo aircraft for test-flying through September 1991. Soviet observers and Honeywell technicians plan to issue a report on the experiment after the test.

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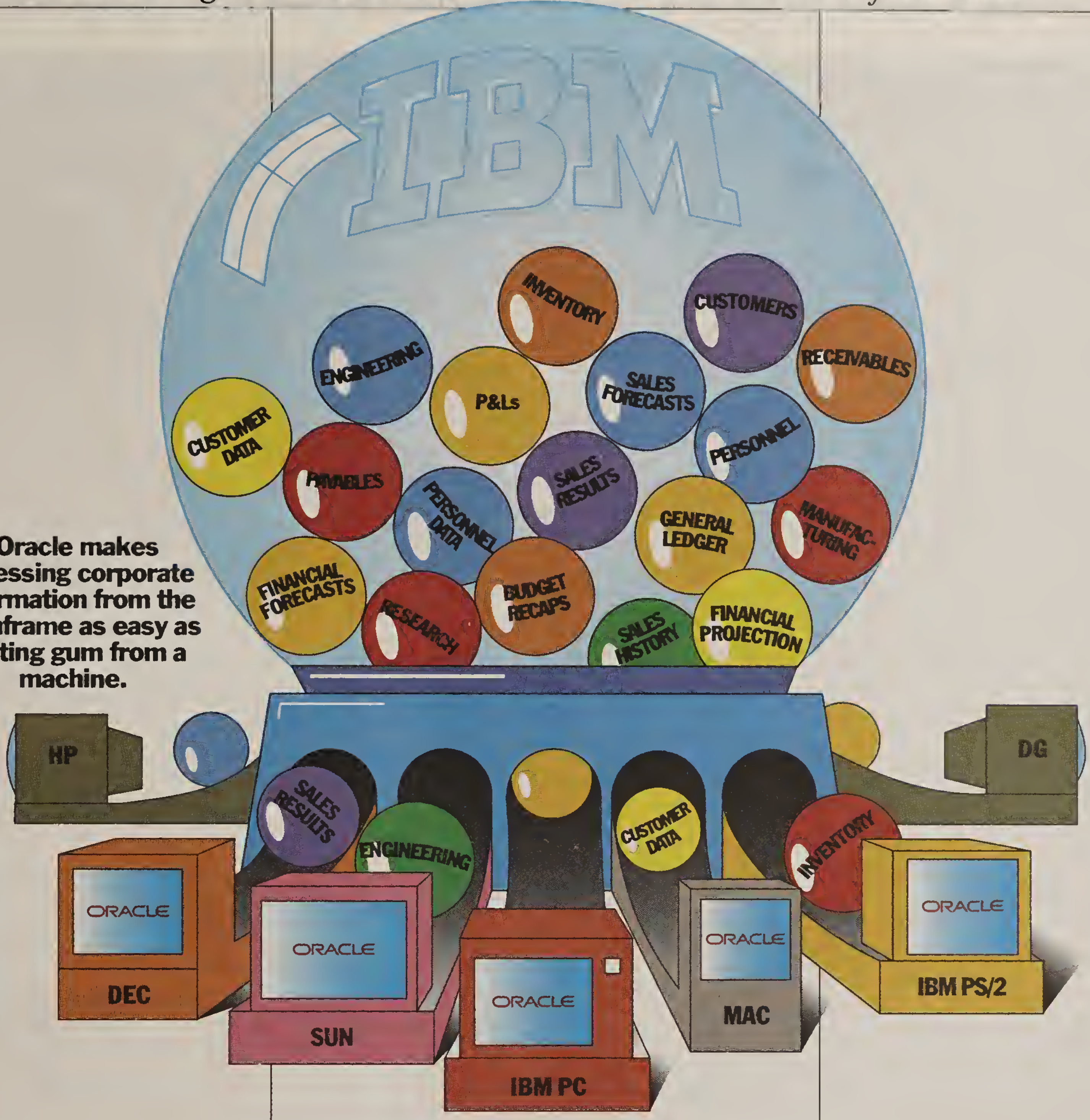

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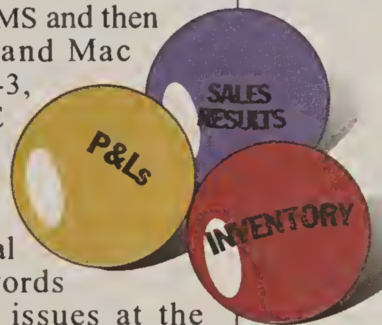

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Trading places: Stock exchanges seek safety nets

BY ELISABETH HORWITT
CW STAFF

NEW YORK — On Jan. 2, some New York Stock Exchange specialists lost their computerized reporting systems for seven minutes to one full hour because of a cable breakage in a nearby manhole.

By midyear 1992, however, a fully redundant information processing and communications system should shield the financial heart of the U.S. against the effects of other disasters such as floods, fires, hurricanes, citywide power outages and similar acts of man and nature.

The Securities Industry Automation Corp. (SIAC), a jointly owned subsidiary that provides information services to both the American and New York Stock Exchanges, is in the process of improving disaster resistance and recovery through two major innovations, said William Conkling, SIAC vice-president of communications and facilities engineering. First, the organization is dividing up its computer power between its site at 55 Water St. in Manhattan and the new Metrotech facility being constructed in Brooklyn. Approximately 15 Tandem Computers, Inc. systems and one IBM 3090 mainframe will reside at each location, ensuring that the sites will remain "fully operational all the time." Thus, if one site's system fails, the other would automatically pick up the slack, Conkling said. While users could experience some degradation if a failure takes place during heavy trading, service would not be interrupted, he added.

The SIAC is also in the process of migrating NYSE's real-time stock-floor reporting system to an Ungermann-Bass, Inc. (UB) local-area network that is based on the Open Systems Interconnect (OSI) standard, Ethernet and dual fiber-optic cable. The new system can automatically reroute transmissions to a backup cable when failures occur, paring network recovery time "from a few seconds to about 20 seconds," said Andrew Bach, SIAC director of communications engineering.

Andy Freeberg

Bach *awaits network management enhancements*

Moving to Ethernet also allowed the SIAC to interconnect its own LANs with those of NYSE and the American Stock Exchange over multiple standard T1 interfaces on intersite fiber-optic cable, Conkling said. With this configuration, a Rockwell International fiber-optic terminal can automatically reroute inter-LAN connections around failures within a fraction of a second, he added.

By contrast, the SIAC and NYSE's former proprietary coaxial LAN from Contel required manual intervention when an intersite cable breakage occurred, which is the main reason the January failure took so long to fix, Conkling said.

SIAC decided to use OSI partly because it expects the standard to outlast other protocols and partly because OSI is used by Intel Corp. "display books," or trading-floor terminals, to transmit transactions to Intel application processors, Bach said.

SIAC used its clout as a major customer to push both Tandem and UB to provide OSI support not yet available on the market. The stock exchange subsidiary is now implementing a prototype OSI version of UB's Access/One LAN server that the vendor has not yet announced officially, let alone shipped, according to UB Vice-President of Marketing Roger Bertman.

SIAC also heavily influenced its vendors' product development in the network management area, Conkling indicated. For example, Tandem has worked with SIAC to develop host-based software that automatically filters incoming network alerts, so that console operators will no longer have to pick out significant events from a slew of unimportant data "spewing out of their terminals," Conkling said.

Andy Freeberg

Conkling *braces systems for disasters of all kinds through two innovations*

Chicago rivals to support international trading system

BY MICHAEL FITZPATRICK
SPECIAL TO CW

CHICAGO — After intense negotiations befitting two bitter rivals, the Chicago Mercantile Exchange and the Chicago Board of Trade have agreed to support a single after-hours international electronic trading system.

Discussions to set the technical wheels in motion began late last week and involve the two exchanges and Reuters Holdings PLC, which will develop the international network and somehow tie together the disparate projects each exchange had initiated.

The Board of Trade authorized $25 million last year for Aurora, its answer to the Globex system at the Chicago Mercantile Exchange, also known as the Merc. The Merc had spent $5 million in Globex's development, and Reuters, one of the Merc's partners in the joint venture, has invested millions in developing its technology for an international commodities trading network.

Under the agreement, the board's Aurora system will play what was called "a special role" on both exchanges, although that role is at the moment uncertain and likely will not be international in scope. Spokesmen at both exchanges declined to specify Aurora's place in their plans.

"All I can tell you is we're aiming for a November rollout," said Don Serpico, senior vice-president of the Merc's operations department. "It's a bit early to say anything else."

As things stand, the board, the Merc and Reuters must resolve four main technical issues: software performance, data security, speed of the international network and user interface.

Computerized after-hours trading would essentially keep Chicago's exchanges open 24 hours, providing customers with greater access to the world's most liquid currency market and giving the Chicago exchanges a competitive edge.

While the Chicago exchanges control some 70% of the world market for futures trading, with as much as $30 billion a day changing hands on LaSalle Street and Wacker Drive, at one time the two controlled all such trading. However, they are facing competition from exchanges in Paris, London and, to a lesser extent, New York and Philadelphia.

Pressure from the Futures Commission Merchants, large brokerages that are members of both exchanges, served as the impetus for the two archrivals to work together. "Basically, the decision was made to serve the [Futures Commission Merchants]," said Mark Prout, a spokesman for the board. "They indicated that they don't want the expense of operating two different systems."

It is expected that the system Reuters designs will be a matching system based around two or three fully redundant Digital Equipment Corp. VAX hosts, with Intel Corp. 80386-based workstations at the front end. The system will ideally be able to handle 300,000 to 400,000 transactions per day, the volume generated on the exchanges.

Globex, announced in mid-1988, is relatively simple. Traders would enter buy and sell orders into a computer, which would match successful trades.

The Board of Trade's Aurora, announced in March of last year, is more complex. The board wanted to emulate the pace of live trading, and Texas Instruments, Inc. used artificial intelligence techniques, based around its Microexplorer board installed in an Apple Computer, Inc. Macintosh II, to create an expert system that would attempt to do so. Speed looks to be most critical.

"It's got to have good response time," said Ralph Walter, senior vice-president in charge of technology and planning at the Chicago Corp., a Futures Commission Merchant. "Those of us who have used real-time systems know that if the system gets a big rush and it spins to a slowdown, you have some serious problems."

Walter also expressed concern about the interface. Globex offered a blind interface, and traders wanted to know who their counterparts were. Aurora addressed this problem through icons, and it could be that Aurora's role will be to act as the front end so that traders will be able to identify their fellow deal-makers.

Fitzpatrick is a Chicago-based free-lance writer.

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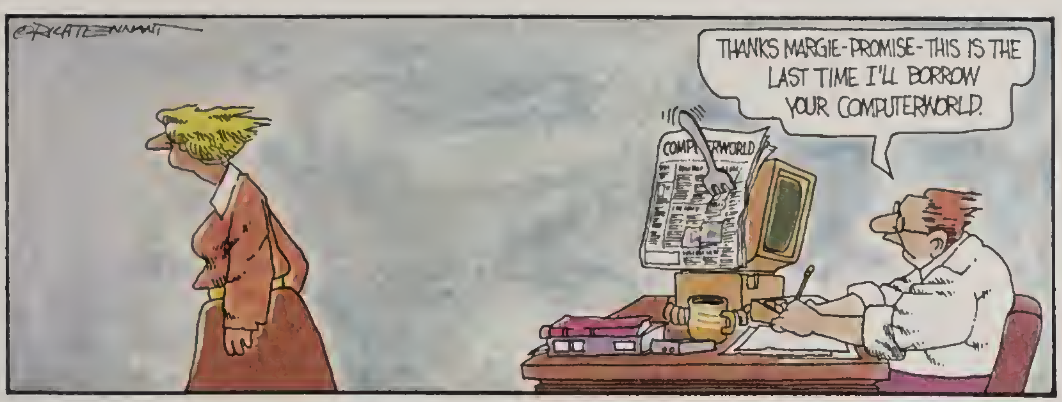
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Macs talk to visually impaired

Software package allows the legally blind to use Apple's computer

Editor's note: The second annual Computerworld Smithsonian Awards, *recognizing individuals and organizations that have achieved outstanding progress for society through the use of information technology, will be awarded in a ceremony to be held June 25 in Washington, D.C. This week,* Computerworld *profiles one of the finalists in the category of Business and Related Services.*

BY JEAN S. BOZMAN
CW STAFF

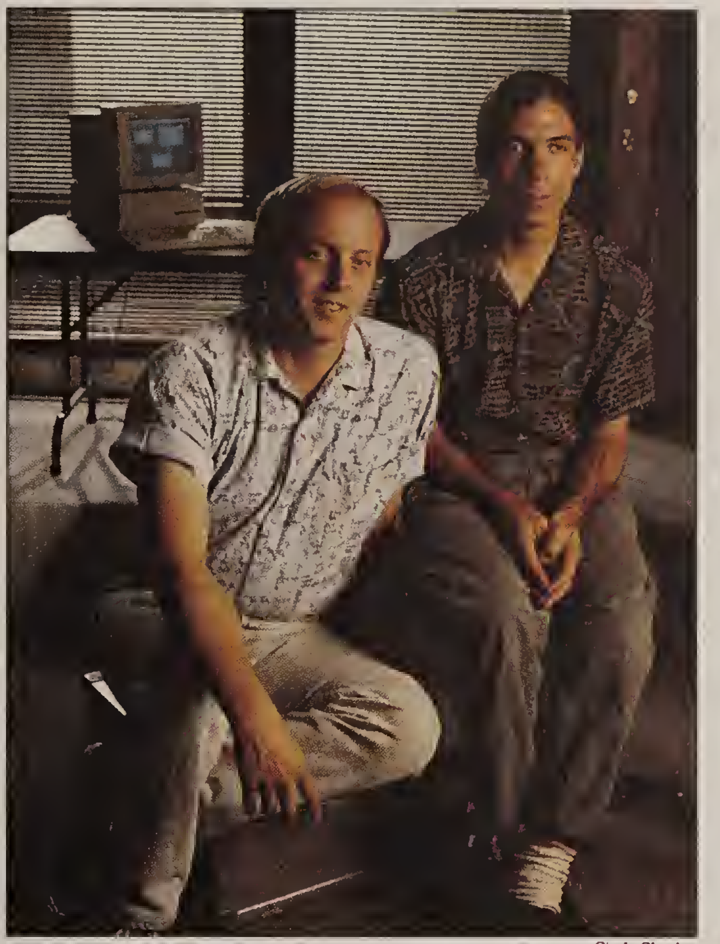
BERKELEY, Calif. — Graphical user interfaces have opened new horizons for most personal computer users, but for blind and visually impaired people, visual windows and icons bring up a new series of obstacles that most cannot surmount. These users rely on character-based screen systems on IBM-compatible PCs to transform on-screen words into speech, braille or scanned output.

That state of affairs left the Apple Computer, Inc. Macintosh's bit-mapped screen virtually off-limits to visually impaired users. However, late last year, Berkeley Systems, Inc., a 5-year-old software firm that produces Macintosh system utilities, started selling a program that could "read" the Mac's on-screen icons and transform them and the applications they represent into spoken words.

The $395 program, called Outspoken, is aimed at the small community of visually impaired computer users believed to be just a fraction of the 500,000 blind people in the U.S. "We've tried to keep the interface very consistent with the Mac's visual interface," Berkeley Systems President Wes Boyd said.

"Our product monitors the Macintosh toolbox," he said. "The toolbox tracks information about how objects are being moved around on-screen, and we extract that information and store it in our own database."

The unique feature of Outspoken, which "speaks" with a built-in voice-synthesizer that is onboard all Macs, is its linkage to the Mac operating system. Having mastered the ways of Outspoken, even sightless users can buy any new Macintosh program and run that application software without needing to adapt it.



Cindy Charles

Berkeley Systems' *Wes Boyd (left) and Marc Sutton aimed to aid sight-impaired computer users.*

Berkeley Systems' Marc Sutton, who is sightless save for a perception of light and dark, said the program allows him to access electronic databases, use off-the-shelf spreadsheet and word-processing packages and store notes in electronic files. Using the numeric keypad rather than a mouse, Sutton traverses the Mac "finder," complete with dialog boxes, as quickly as a sighted user.

"There's a real satisfaction that you can conceptualize what's on-screen," said Sutton, who is the technical-support manager for the product. "In everything I do, whether I'm working in an office, eating in a restaurant or walking around the house, I go through a lot of mapping in my mind. Now, I can navigate around the Macintosh screen, even though I can't see it. It's not abstraction anymore." Documentation comes in braille, on audio tape and as embossed images of screen icons.

Sounds substitute for visual cues. As the cursor travels across the Mac's screen, Outspoken users hear a series of words describing objects the cursor touches. For example, the Mac voice might say, in somewhat flattened, electronic tones: "Microsoft Word," "icon" or "database file." When the cursor crosses into another window, a slight beep is heard. As words are defined, a slight background noise is heard.

As a small firm with $1 million in annual revenue and a staff of 15, Berkeley Systems might seem an unlikely source of special-needs software. But Outspoken and an older product, Inlarge, which enlarges on-screen characters to 16 times the normal size, were developed with funding from the National Institute of Health's National Eye Institute in Bethesda, Md. The $50,000 grant that was used to launch Inlarge was one way in which the small software house could target a specific and untapped market.

Aside from the grant project, Berkeley Systems also keeps afloat by selling mass-market Mac utilities. Boyd said he also plans to broaden the product's appeal by porting Outspoken to other graphical interface systems, including IBM and Microsoft Corp.'s Presentation Manager.

As useful as Outspoken seems to be, its use is hampered by a catch-22 marketing syndrome. Although it could create a new group of Mac users, many visually impaired users are already committed to IBM-compatible PC technology or special-purpose computer add-ons that can cost from $2,000 to $12,000. Because they are not part of the Mac user community, they are not aware of the introduction of new Mac software such as Outspoken.

But some users have learned of the product through Apple's office of special education and rehabilitation. One user at a California aerospace firm feels a new sense of independence because of the Outspoken package. "Before this, I had people helping me by setting up special Hypercard stacks so I could read them from left to right in a straight line," said the user, who has partial vision. "Now, I can go out and buy any new package, install it myself and start working with it right away."

Cream of the crop

The following finalists in the Business and Related Services Category have addressed the needs of some special groups of computer users:

- Dragon Systems, Inc. in Newton, Mass., created Dragon Dictate, a program that allows users to communicate with their computers by talking rather than typing.
- Guest Message Systems, Inc. in Fernandian Beach, Fla., wrote a voice-mail system designed for use in hotels and resorts. The system prevents errors caused by transcription of messages while reducing hotels' overhead costs.
- Ambassador College in Pasadena, Calif., designed Swiftnet, a personal computer-controlled telecommunications switch that allows users to create software-defined networks over public-telephone network lines.
- IBM's National Support Center for Persons with Disabilities, based in Atlanta, maintains a database of products and services that can be used to improve computer access for people with special needs. The center receives about 2,000 requests each month for information and assistance, IBM said.

U.S., Japan venture into 5th-generation computer

BY YASUKO YOSHIMI
SPECIAL TO CW

TOKYO — The first Japan/U.S. joint fifth-generation computer research project will be launched this month to develop a software program that analyzes information on human genes, the Japanese Ministry of International Trade and Industry (MITI) said late last month.

Under the project, workstations at the Argonne National Research Institute in Chicago will have access to the prototype fifth-generation computer at the Institute of Computer Technology (ICOT) located here.

"The joint project was triggered by a proposal from the Argonne Institute," said Takashi Kurozumi, ICOT's deputy director. "They showed a keen interest in our machine at the artificial intelligence symposium sponsored by the National Science Foundation last November."

Kurozumi said he expects the project to make the fifth-generation computer a system that scholars can feel comfortable with. "Although we have developed operating systems and controlling software, our effort cannot be [run] without application programs," he said. "Our goal is to develop both hardware and software that stand up to practical use."

ICOT has been developing the AI-based fifth-generation computer under a 10-year MITI project to be completed in 1991. The machine features parallel processing and reasoning functions comparable with Neumann computers that read and process programs and data successively.

MITI has allotted two years for the joint development project, hoping to ease high-technology frictions between the two countries, according to Akira Kato of the Ministry's Electronics Policy Division.

DG unveils low-price PCs

WESTBORO, Mass. — Hoping to appeal to cost-conscious and price-savvy personal computer users, Data General Corp. last week unveiled two IBM AT-compatible PCs with list prices comparable to those of mail-order suppliers.

"The mail-order vendors have established a different street price in the industry," said John Kavazanjian, vice-president of DG's PC division. "With our new offerings, we want to get the attention of our end users and [value-added resellers]."

The Dasher/386-25K, with an Intel Corp. 25-MHz 80386-based processor, has an entry price of $4,995, which includes 4M bytes of memory and a 100M-byte hard disk. The system operates in both MS-DOS and Unix environments, the firm said.

DG also announced the Dasher/286-12J, a compact, 12-MHz Intel 80286-based, MS-DOS machine. Priced from $2,375, the base configuration includes 1M byte of main memory, two disk drives and a 40M-byte hard disk.

To sweeten the deal, DG is offering overnight express parts delivery and next-day, on-site PC support as part of the standard purchase price. Both systems are scheduled to be available this month.

ADVANCED TECHNOLOGY

TECH TALK

Flash: Secret messages

■ Researchers at IBM's T. J. Watson Research Center in Yorktown Heights, N.Y., have developed a "quantum public key distribution device" capable of sending encrypted messages using light beams. The scientists said that it is the first communications system ever built to use the "uncertainty principle," a fundamental law of physics, to protect the secrecy of messages. The device emits and receives codes sent as faint flashes of green light. The faint light flash cannot be measured without disturbing its properties. Thus, if an eavesdropper attempts to intercept the flashes, the intrusion would be detected.

……

Fast-as-light imaging

■ Nippon Telegraph and Telephone Corp. has developed an optical processor capable of manipulating more than 2,000 frames of images per second in real time, the company said recently. It has also invented a spatial light modulator, which attaches to the processor, that can rapidly record, read out, amplify and invert images.

Building Paul Bunyan's laptop

Giant PC intended as tremendous teaching aid for computer-shy museum goers

BY MICHAEL ALEXANDER
CW STAFF

Smaller is nearly always better, at least when it comes to designing computer technology. But at the Boston Computer Museum, the big idea is a computer big enough to walk around in.

The museum is putting the finishing touches on a $1.2 million exhibit built around what must certainly be the world's largest computer. The exhibit, complete with giant working keyboard, trackball and monitor, aims to show visitors in a nonthreatening way how a personal computer works, said Oliver Strimpel, the museum's executive director.

"There is so much fear and unease with computers and technology in the public at large, we wanted something larger than life," Strimpel explained.

Visitors walking up to the exhibit are prompted by voice command to use the computer to calculate the shortest distance between two cities. Overhead, a large computer monitor — actually a rear projection screen — displays a map of the world.

After using a trackball the size of a boulder to select the city of departure and destination, visitors actually see how the computer calculates the shortest route between the two. At the same time, the screen displays video images of cities that would be passed through en route to the final destination.

"The whole thing is simulated to be working," Strimpel said. "The first thing is to actually use this giant computer, using the giant function keys and trackball. The purpose is to get a feeling of what it can do."

After watching the program run, visitors step through a passageway into the computer, past a giant video board, and then into a room-size motherboard, complete with a CPU, random-access memory chips, a floppy disk drive and other components.

The larger-than-life screen, trackball and keyboard are controlled by an Apple Computer, Inc. Macintosh IIFX. The Macintosh also runs a program developed in-house called World Traveler. Special sound effects, lighting and video displays are controlled by software that runs on a Digital Equipment Corp. Microvax.

Throughout the computer exhibit are several monitors running video programs that describe in detail how each component contributes to the city-to-city calculation.

The computer's operations are slowed by a factor of 10, allowing visitors time to stop at each component to see computing processes as they are carried out.

Opposite the motherboard are computerized "learning stations" and a software theater where visitors receive a humorous introduction to how software works and controls computer hardware. "Our concern was not to overemphasize the hardware at the expense of software," Strimpel said.

The museum, aided by a local exhibition design and construction company, started building the computer in November. It is scheduled to open to the public this month.

Bill O'Connell

Larger-than-life *PC aims to teach*

FRAM chips enter the memory menagerie

BY MICHAEL ALEXANDER
CW STAFF

Just when you thought you had managed to sort through the pros and cons of SRAMs, DRAMs, EEPROMs and other memory chip technologies, along comes yet another: FRAM.

Short for "ferroelectronic random-access memory," a FRAM is a chip made from ferroelectronic ceramics and conventional semiconductor materials. The advantages are that FRAMs store electricity more efficiently and pack more capacitors into a circuit than other chips. What intrigues FRAM chip makers most, however, is that FRAMs can retain data for up to 10 years without power. The chips are not flawless: The ceramic loses its ability to store data and lacks the endurance needed for high-speed switching applications. Researchers expect to go beyond those limits, however.

Ferroelectronic technology is not new — IBM and AT&T Bell Laboratories tried making ferroelectronic memory chips in the 1950s, but those efforts failed. Now, Ramtron Corp. in Colorado Springs and National Semiconductor Corp. have hit on a way to produce FRAMs by applying a film of ferroelectronic material to a semiconductor wafer. The design combines the best of both technologies.

Both companies are selling FRAMs for computers, automobiles, satellites, consumer electronics and other products.

Ramtron's FRAM is the world's first true nonvolatile read-write random-access memory, according to David Bondurant, director of business development.

The company is close to completing a production plant in Colorado Springs and plans to begin manufacturing 1K- to 16K-bit FRAMs later this year. Enough data could be stored in such a chip to replace DIP switches in printers, for example. The company is also developing a chip for use in an automobile odometer to record mileage and other data.

Ramtron expects to begin churning out 256K-bit chips in 1991 and 1M-, 4M- and 16M-bit chips by 1992, Bondurant said. "At [4M-bit capacity], FRAMs could be competing with main memory technology in computers."

Worldwide race

Several companies in the U.S., Japan and Europe are racing to develop and commercialize the technology. Ramtron has inked development pacts with Seiko Epson Corp., NMB Semiconductor Co. Ltd. and ITT Semiconductors, among other companies, to help foster continued development of the technology.

Dataquest, Inc., a market research firm based in San Jose, Calif., forecasted that annual sales of FRAMs will grow dramatically during the next three years, hitting $350 million in 1992.

The impact of ferroelectronic memory chips on the computer business could be revolutionary, according to proponents of the technology. For one, FRAMs could replace magnetic media for storing data, at least when performance is at stake. The chips, unlike hard disk drives, have no moving parts and thus would be faster and more reliable. The downside is that FRAMs would cost more per megabyte of storage capacity.

"We're suggesting that in the future, computers will have FRAMs on-line and optical discs for storage with nothing in between," Bondurant said. "The disk folks might not agree with that scenario, but that is the potential."

FRAMs could also be used to store digitally compressed pictures and voices. A portable voice recorder using a 4M-bit FRAM could be capable of storing 30 minutes of voice, yet have about the same dimensions as a credit card. Similarly, an electronic camera could store dozens of pictures on a matchbook-size memory card. Scientists at Sony Corp. have predicted that FRAMs may one day replace compact discs for music.

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EDITORIAL

Unsafe at home

Go on, my friend, and fear nothing; you carry Caesar and his fortune in your boat.

Cicero

AT AN INVESTMENT banking seminar last week, a panel of nine distinguished venture capitalists painted a guardedly optimistic portrait of the high-tech community. Generally speaking, they felt that the homegrown spirit of U.S. entrepreneurialism, combined with user demand for innovative products, is making for a favorable investment environment. The fact that the Dow is at an all-time high no doubt added to this optimism.

When questioned by members of the press on what moves the Japanese are likely to make, both in the software and services arena where the Japanese presence is minimal and in the high-tech venture market in general, the panel didn't think there was much to fear except fear itself.

As one person put it, the Japanese are so paranoid about stoking the Japan-bashing flames that they are intentionally keeping a low profile in these markets. Given that the Japanese had no problem buying Rockefeller Center, one of the most visible pieces of real estate in America, this argument is questionable. But it does stand to illustrate a prevailing mood.

By contrast, when we interviewed Thomas Watson Jr. last week (see story page 124), the man who catapulted IBM to world-class status became most animated — even agitated — when asked about the greatest problems facing this country. We don't have enough fear, Watson said. We're too cocky, too fascinated with our own success and self-importance to worry in a meaningful enough way about global competition.

So who's right?

If we were the betting type, we'd have to put our money on the scion. He has the incomparable elements of history and long-term perspective in his favor.

That's not to say Watson and those like him are quietly advocating Japan-bashing or Germany-bashing or any other kind of mayhem. On the contrary, they're saying we ought be a lot harder on ourselves. Nothing recedes like success, and losing a competitive edge begins with subtle changes in the mind-set of millions of people, not with changes in "the government" or "the company."

Until now, most of the consciousness-raising in the U.S. vis-a-vis global competition has focused on the opportunities within global markets, which is fine to a point. But we also have to know that our domestic markets will remain the prime target of other multinationals, and we should be appropriately fearful. An ostrich can outrun almost anything in its neighborhood, but that speed isn't worth diddly when it sticks its head in the sand.

LETTERS TO THE EDITOR

Silver lining

There has been a tremendous amount of discussion regarding the fact that Robert T. Morris has not received a harsh enough treatment by the courts.

Morris should probably be given a medal. The problem caused by the worm he introduced into the Internet system has forced the industry to focus on the issue of security in a way in which it never would have without the breach caused by the worm.

It is not punishing Morris that we should be concerned with; what we need to be concerned with is implementing solid, hacker-proof security on our mainframe, minicomputer and personal computer systems.

Marc Baime
Systems Engineer
GTE Data Services
Temple Terrace, Fla.

TDS facts

Regarding your coverage of the TDS 7000 Series of health care information systems, "TDS offers 'cradle to grave' patient system" [CW, April 30]:

The TDS 7000 Series is not the first new system introduced by TDS in 19 years; the TDS 4000 system (predecessor of the TDS 7000) was introduced in the spring of 1987. Additionally, since the implementation of our first system in 1971, there have been more than 30 major system enhancements.

Also, your continued references to the high cost of the system are most peculiar. One of the objectives of the 7000 Series is to make proven TDS performance available to virtually any size hospital or health care system. The 7000 Series is a family of products that have been packaged and priced for the express purpose of putting our systems within reach of hospitals that previously could not afford them.

Clearly, our ability to package and deliver the system for either in-house data centers or remote processing shows that we were quite "explicit in addressing the financial considerations hospitals would have to make."

While it is true that our system was developed before the advent of standards, TDS systems have actually run on proprietary communications to guarantee system performance — particularly response time under peak load conditions. It has always been our intention to move to standard protocols once we were assured that performance would not be compromised.

Finally, the system will be available in late 1990 — not late 1991, as reported.

Jim Kann
Director, Advertising and Marketing Communications
TDS Healthcare Systems Corp.
Atlanta

Hold that pizza

Richard Koeller's advice [CW, April 16] about the value of ad hoc partnerships with consultants (to take the time to develop relationships with consultants instead of treating them like hired help) was wonderful.

One additional way of applying this effectively is in working with your recruiting sources. Too often, managers poorly spec out positions or fail to explain their needs or desires to their human resource departments. Then they wonder why outside recruiters are ineffective.

Too often, the information that we as recruiters receive seems like someone has placed an order for a pizza (two programmer/analysts, one project leader, hold the poor language skills and can you deliver in 30 minutes or less?) instead of the carefully thought-out description that would enable us to serve a client effectively. Applying the same philosophy to recruiting will enable your firm to prosper, too.

Jeff Altman
President
Jeff Altman & Co.
New York

Concord discord

Your recent "Inside Lines" reference to Concord Communications [CW, April 16] contained multiple errors of fact. Concord is not "on the block" and has no relationship whatsoever with Concord Data Systems. Had *Computerworld* contacted us, we would have been able to prevent your errors.

Concord just completed a very successful 1989, in which we added many customers, experienced revenue growth of almost 50% and had an impressive level of profitability. We are working hard to build a successful company and are optimistic about our future.

Michael J. Zak
Vice-President
Concord Communications, Inc.
Marlboro, Mass.

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701. Fax: (508) 875-8931; MCI Mail: COMPUTERWORLD.*

Imaging question looms large

MICHAEL STONECIPHER

It's not easy being an information systems manager in today's world. Planning for changes or advances in technology can be a precarious and risky position. Bet on a new technology that seems to be revolutionary but doesn't pan out, and your organization can pay a big price in both dollars and frustration. Miss a major advancement that is truly revolutionary with the potential to significantly improve your business, and you'll pay an even higher cost — a competitive cost.

The increasing popularity of personal computers and the advent of PC local-area networks is a good example of a technology that caught most IS managers off guard. Today, IS organizations are struggling to get the acquisition of LANs and PCs by end users under control. What was initially an effort to resolve productivity issues has blown up into a major headache for IS seemingly overnight.

However, just when you thought there was a light at the end of the tunnel, there's a bigger bear at the door. And you need to be both aware and concerned about it.

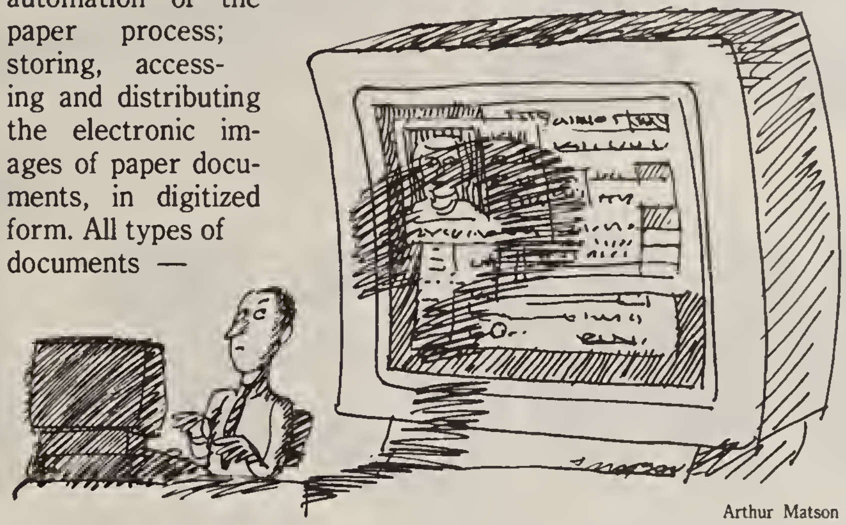
Image processing systems will potentially light a fire under every major corporation in the world in a very short period of time. Not a day goes by that an end user or a business unit manager isn't being made aware of the competitive edge that this technology brings to the hands of the person who implements it first.

Burden on IS

The burden is on IS management to develop a strategy that will actively deal with this emerging technology. It will make fundamental changes in the way you do business. Unfortunately, imaging is not part of the mainstream information structure of most enterprises. Systems are being installed on an exception basis with little, if any, understanding of the impact on the organization as a whole. There is little knowledge of how to integrate image processing with existing applications.

Business unit managers have a burning desire to increase productivity and cut costs. The immediate result of image processing is both. But in the long run, IS managers will be faced with the potentially overwhelming task of bringing together all the imaging pieces.

Just wait until there are 10, 20 or even 100 different image systems installed in your enterprise, each one with the potential for millions, if not billions, of image documents stored on them, and the originals lost forever. If you believe you can bypass the technology until it is proven safe, you'll not be doing yourself or your organization any favors.



Arthur Matson

Image processing is the automation of the paper process; storing, accessing and distributing the electronic images of paper documents, in digitized form. All types of documents — typed memos, handwritten notes, forms, medical prescriptions, legal papers, even photographs and drawings — are fair game for imaging.

The increasing popularity of the PC has provided the catalyst for image processing. The PC gave the end user the ability to do one basic function that has to date been missing — the ability to display a digitized image on a generally accepted and cost-effective platform.

If the PC was the way, then database software has become the means. The inclusion of image as a data type allows for the development of traditional applications such as accounts payable, receivables, applicant tracking and inventory control.

Finally, networking developments are increasingly able to accommodate the burden of image traffic. Fiber Distributed Data Interface, a newly evolving networking standard, will transfer data at more than 10 times the bandwidth of traditional LAN topologies.

In the wide-area networking arena, Integrated Services Digital Network promises to provide end users with access to relatively simple-to-use, high-speed, reliable, competitively priced voice/data/image information services.

So the question is no longer, when will imaging be a reality? All the necessary components are in place. The questions should be, what are its capabilities? How does it integrate with my applications environment? And, strategically, how do I fit it into my information structure? The helter-skelter introduction of imaging technology will wreak havoc on an enterprise unless its introduction is managed effectively.

The State of California charged ahead with a multimillion-dollar image processing system to automate Uniform Commercial Code filings. The results were disastrous, creating chaos in the California banking industry for months and forcing the state back to the manual processes. The State of California was rightfully convinced that image processing was capable of resolving the deficiencies in the process. Its failure was in the execution — not fully understanding the impact of the technology and planning appropriately.

In the short term, IS needs to be involved in researching the capabilities and attempting to fully understand the significance of the technology and its implementation.

In the long term, IS managers do not want to have the type of problem with image processing systems that they are currently having with PCs and PC LANs: fundamental incompatibilities and proprietary architectures conflicting within the corporate environment. Imagine the scale of the problem if you throw in the search for a paperless environment.

Stonecipher is a computer marketing representative based in Mission, Kan.

Time to get into the game, with a new set of rules

GLENN RIFKIN

Let's face it: When the lights are out and no one is watching, the folks in Japan and Europe must smile and say to themselves, "The U.S. sure is a fun competitor. It ties itself into knots at every turn." What else can they think?

In an era when internal cooperation is a must to compete in the global economic wars, we are still hamstrung by outdated antitrust laws. Antitrust legislation has been critical in creating a level playing field in U.S. business, forcing out the robber barons and giving entrepreneurs a chance to stake their claim to the American dream. But today, the game has changed, and we must learn to play by some new rules.

Antitrust legislation was never intended to cripple U.S. chances to compete globally against tough, aggressive players who operate under a different set of dictums. The semiconductor industry's woes have demonstrated clearly that we can be blindsided in a market we once dominated by a country (Japan) that is willing and able to marshal all the forces necessary to take control. You can argue until Tuesday whether Japan was unscrupulous in this endeavor. But the horse is out of the barn, and the door is closing fast.

The computer vendors have seen what has happened in the semiconductor arena and are anxious to avoid such a debacle in their areas of concern. Manufacturing is one such critical concern. Jack Kuehler, president of IBM, has said, "Production joint ventures can be a tool, an important tool, in an age of greater cooperation" that is needed to boost U.S. competitiveness.

The failure of computer-related consortiums to produce breakthrough technology and enhance our global competitiveness may be because of the lack of viability of that structure in our culture. Or it may be that major computer vendors are giving less than their all to these joint ventures for fear of antitrust action.

Congressional hearings on this issue have become commonplace on Capitol Hill. The Senate Judiciary Subcommittee on Technology and the Law, chaired by Sen. Patrick Leahy (D-Vt.), has been pushing for S.1006, an extension of the National Cooperative Research Act of 1984. S.1006 extends the act's coverage to manufacturing joint ventures, and it seems clear that Congress must move swiftly to pass this and other reforms.

Small firms, big struggle

Leahy pointed out that U.S. companies are up against projects such as Europe's JESSI program — a $2.5 billion European Community project designed to get Europe back in the running in the microelectronics market — and Japan's many cooperative ventures. "Small wonder that individual companies in our country cannot afford to go it alone anymore. They are struggling uphill while our competitors are on a toboggan ride," Leahy said. "Are we going to tell the world once and for all that America is a giant and that the giant knows how to get its product to market? Or are we going to turn our technology prowess over to the Japanese and the Europeans?"

The issue is bipartisan. Sen. Strom Thurmond, the crusty old Republican from South Carolina, has thrown in his two cents on S.1006. "American firms cannot afford to settle for less than the most advanced means of manufacturing if they are to be successful," Thurmond said. "This means they must make substantial investments in state-of-the-art facilities. Such investments however are often too costly for one firm to undertake. Joint manufacturing ventures may provide just the answer."

Antitrust actions have long loomed large in the decision-making processes of U.S. corporations. Major vendors such as IBM have avoided joining in such consortiums as the Microelectronics and Computer Technology Corp. for fear of antitrust questions. The effectiveness of consortiums has been diminished by the threat of antitrust, even with the National Cooperative Research Act.

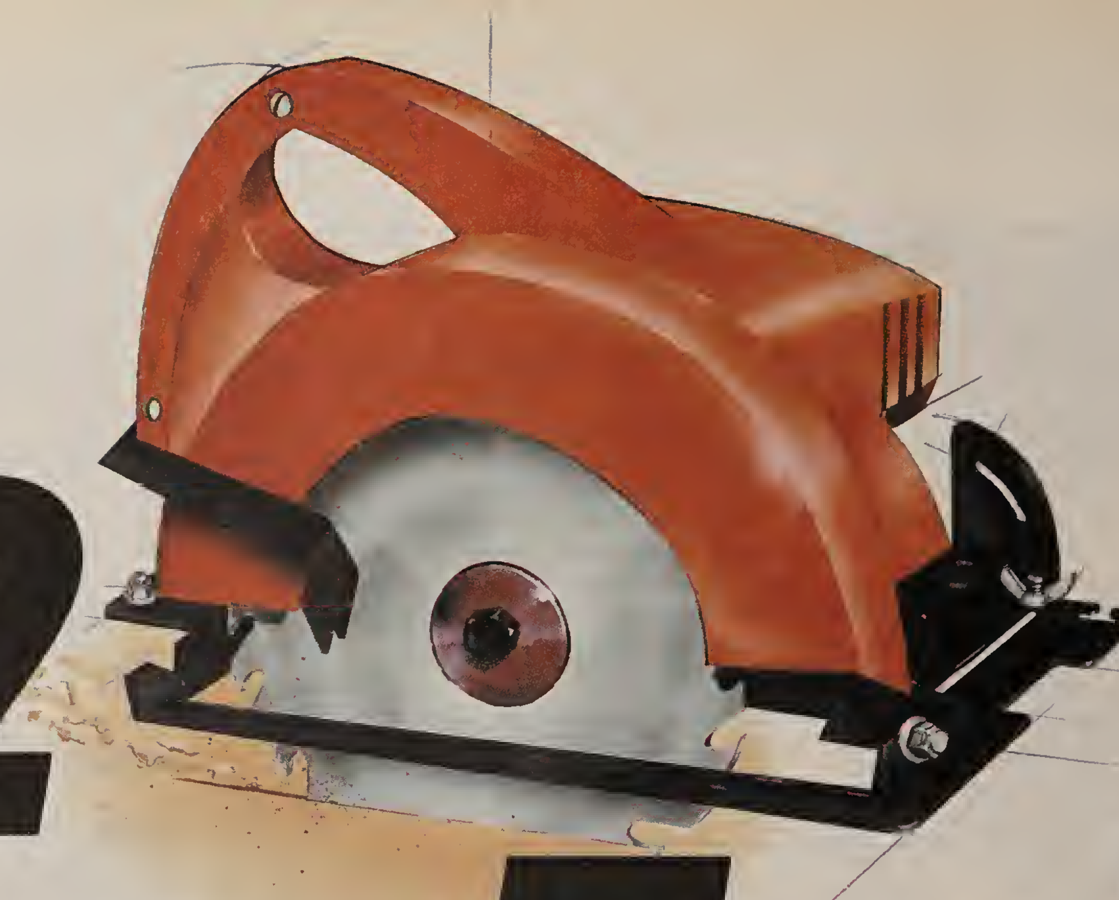
Successful entrepreneurs point out loudly that this is all just needless nattering. U.S. ingenuity and creativity brought us to greatness, and it will keep us there. Individuality, they cry, will win out. Such wishful thinking simply does not fly in the global business climate of 1990.

Even such bastions of creative thinking as AT&T's Bell Labs no longer concur with such ideas. Ian Ross, head of Bell Labs, recently told Congress that antitrust laws must be relaxed. "It is important to reduce any legal impediments to U.S. cooperative activities so that business risks and commitments that are unacceptable to individual companies can be shared among many companies," he said.

It is commendable that our society has established such effective checks and balances over the course of our history. The system has allowed the individual as well as the powerful conglomerate to find a way to succeed. It is not necessary to forfeit this spirit in order to loosen the reins of antitrust. Abuse and unfair practices must still be monitored and stamped out.

However, for the U.S. to assume that the world will sit by and duel with equanimity on the global business front is naive. We can't win or even compete in a race if our ankles are tied together. Congress must make the easing of antitrust a priority.

Rifkin is a *Computerworld* features editor.



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SOFT TALK

Maryfran Johnson

Who you gonna call?

It's funny how some things come back to haunt you.

For IBM, it was the irritating ghost of an old benchmark, risen from the grave with the eager assistance of rival Tandem Computers.

This particular poltergeist came in the shape of the 18-month-old results of a California Department of Motor Vehicles benchmark. It raised the painful memory of a day when an IBM 3090 Model 400S lost an account to a Tandem VLX computer; thus, the contract to provide a relational database management system for the motor vehicles department went to Tandem's Nonstop SQL instead of IBM's DB2.

At the time, of course, IBM didn't care enough to do its homework. This was not a big hardware sale. The commission was a yawner. And with 5,000 DB2 licenses out there, who's to moan and groan over one missed opportunity?

But Tandem didn't let the matter rest. The marketers for the $1.6 billion firm gleefully used the benchmarks to bash the $60 billion behemoth when Tandem's Nonstop Cyclone made its October 1989 debut.

IBM watched the Tandem campaign with gathering dread, then decided to fight back.

Two weeks ago, IBM conjured up its new ending to this old story and went to a lot of

Continued on page 31

Disk arrays challenge DASD

RAID storage technology promises better performance and cost-efficiency

BY J. A. SAVAGE
CW STAFF

Mainframe storage devices have been getting smaller over the years, from 14-in. platters down to 8-in. platters, but Dave Gordon claims that 5¼-in. disk drives can be strung together to provide even greater capacity and speed than direct access storage devices (DASD) at a fraction of the cost.

The technology is known as RAID, for redundant arrays of inexpensive disks, and is what several firms, including Boulder, Colo.-based Array Technology Corp. and its president, Gordon, are banking on as they take on established storage vendors.

The drawback, however, is that while these products usually offer device drivers for Unix systems, they generally cannot be used with proprietary operating systems unless users write the device driver themselves.

A typical RAID consists of a few disk drives, including one extra drive for redundancy in case of failure, a CPU or embedded processor and software. The drives use either a small computer systems interface (SCSI) or an enhanced small disk interface (ESDI). The software "stripes," or breaks up, the data streams from the bus for storage across all the disks at once, allowing for quick data transfer.

Raiders to be

RAID looks promising, said Lee Elizer, president of Data Storage Concepts, a Boulder, Colo.-based market research firm. "RAIDs won't replace [IBM] 3390s this week, but they're not a paper tiger."

Array, Maximum Strategy, Inc. in San Jose, Calif., and Storage Concepts, Inc. in Irvine, Calif., offer RAID products aimed at the mainframe and supercomputer market. Another firm with a RAID product is Pacstor, Inc. in Los Gatos, Calif., which gears its product to servers and high-end desktop computers with 3½-in. disk drives. They can be bought with Compaq Computer Corp.'s servers.

Currently, 3390-type DASDs transfer data at 3M to 4.5M byte/sec. Elizer said that while the next level of DASDs will be able to transfer information at approximately 6.5M byte/sec., "RAIDs let you leapfrog that relatively cheaply."

Gordon said his prototype RAIDs with 11 disks had a 17M byte/sec. transfer rate.

Maximum Strategy, claimed to reach transfer rates of up to 160M byte/sec. using a parallelized interface called High Performance Parallel Interface (HPPI), said Neal Murray, director of sales at the company.

HPPI is a standard being developed by the IEEE, said Robert Abraham, an analyst at market research firm Freeman Associates, Inc. in Santa Barbara, Calif. Abraham said HPPI is at the leading edge of speed for data transfer.

Few businesses will need that kind of transfer rate in the near future, Elizer said. However, with the development of the Hubble space telescope, seismic research and some applications for benefits, the need for huge transfer rates is growing, he said.

To divide up the work in the nonparallelized Array RAIDs, Gordon said that there is 500K bytes of software in each of his machines, with each machine holding up to five disks. Up to 72 drives may be linked together with Array's architecture. Array uses a 12 million instructions per second R3000 processor from Mips Computer Systems, Inc. as a controller. Array is a wholly owned subsidiary of Tandem Computers, Inc.

Using a two-processor architecture, Maximum Strategy has a Motorola, Inc. 68030 chip that runs the interface for every 10 modules or 40 5¼-in. disks.

Storage Concepts puts up to nine 5¼-in. disks in each module with up to 72 drives per proprietary controller processor, said Martin Bock, vice-president of sales. Both Maximum and Storage Concepts use ESDI.

At the low end, Pacstor's 12-disk arrays are powered by an embedded Intel Corp. microprocessor and SCSI. The company also offers a smaller six-disk array with no internal processor whose software — about 30K bytes' worth — resides in host memory.

While the reliability of each

Continued on page 30

Candle purchases DB2 line from CDB

In a move to expand its presence in the database arena, Candle Corp. recently acquired the full line of DB2 tools from CDB Software, Inc.

The announcement underscores the growing emphasis that software developers are putting on IBM's DB2 database.

As part of its focus on IBM's Systems Application Architecture strategy, Candle, a Los Angeles-based supplier of data center management software, has been stepping up its efforts in the database area. Last year, the firm introduced a version of its flagship Omegamon performance monitor for DB2 and claims to have since sold about 1,000 licenses. The six newly acquired products from CDB focus on DB2 data management and application performance and give Candle an entry into the realm of data administration.

Candle will take over maintenance and support of the CDB products, but the companies said they will work together on development of future products.

Many opportunities

"This is a significant move for Candle," said Arnold Farber, president of Farber/LaChance, Inc., an automated operations consulting firm based in Richmond, Va. In addition to making Candle a contender in the DB2 environment, Farber said there were significant opportunities to tie in database tools to Candle's performance monitoring and automated operations software.

The data management tools bring Candle closer to its vision of being able to pinpoint a performance bottleneck, whether stemming from DB2, CICS or a DB2 application, anywhere on a network. The CDB tools will reportedly be integrated into Candle's umbrella Omegacenter to provide seamless navigation between products.

Omegacenter acts as a single entry point into the Omegamon performance monitors and automated operations software.

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Power company levels peaks with energy savers

Delmarva Power & Light turns off its own lights and cools mainframe with ice to save electricity

ON SITE

BY MEL MANDELL
SPECIAL TO CW

Do power companies need to conserve power? "Yes," answered Delmarva Power & Light, Inc., and showed the way with its new $11 million data· center near Newark, Del. The building's showcase "peak-shaving" system not only shrinks demand but also provides chilled water to the mainframe whenever power to the 100,000-sq-ft building is interrupted by a lightning strike.

Routinely, the cold-storage system cuts peak demand by 100 kilowatts. At night, when demand on the Delmarva power grid is low, a Trane Co. centrifugal chiller freezes the water inside the eight Levload water tanks from Calmac Manufacturing Corp. in Englewood, N.J. Two smaller chillers provide cooling for the building and chilled water for the mainframe.

During the day, the two reciprocating chillers are shut down, and the more efficient centrifugal unit cools the building while water chilled by the melting ice keeps the computer room and its equipment cool. When all eight tanks are frozen, they can cool the building and its occupants for six hours.

Cool nights

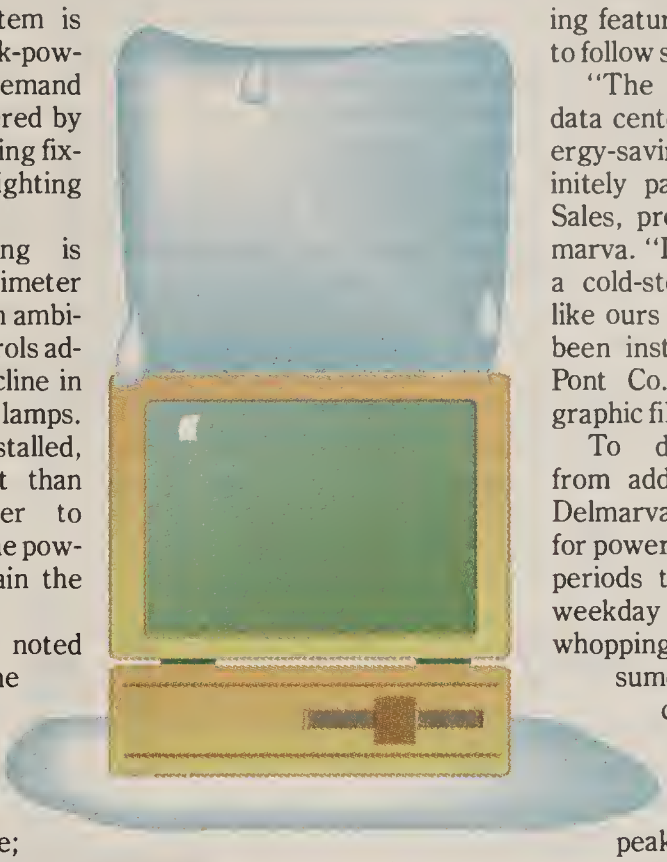
In the event of a nighttime power failure, the chilled water is automatically diverted to cool the IBM 3090 Model 200J. An Emerson Electric Co. uninterruptible power supply keeps the mainframe and the pumps for the chilled water running until the backup, diesel-powered generator is activated.

According to Robert Mahaney, supervisor of operations coordination, the cold-storage system has been called on to provide direct cooling to the mainframe on an emergency basis about a half-dozen times since the data center began operating in 1987. Usually, the interruptions do not last more than 10 or 15 minutes because the data center is served by two power substations. In addition, the backup system, including provision of chilled water, is tested quarterly. It has never failed to operate, according to power company officials.

The cold-storage system is the main way in which peak-power demand is lowered. Demand and load are further lowered by using highly efficient lighting fixtures and sophisticated lighting controls.

For instance, lighting is dimmed around the perimeter zones of the building when ambient light is high. The controls adjust for the inevitable decline in output of fluorescent lamps. When the lamps are installed, they provide more light than needed, reducing power to them. As the lamps age, the power is increased to maintain the desired light level.

In addition, Mahaney noted that the back half of the computer room containing the mainframe and 22 IBM 3380 disk drives is left dark when no one is working there; light in the front half is left on because it contains the tape drives, which require frequent loading by operators.



Scott H. Lawson, project manager for the design of the building's heating and ventilating system, estimated that the peak-shaving system would pay for itself in 2.3 years if the building belonged to a customer at Delmarva P&L. Lawson works at Paul H. Yeomans, Inc., Philadelphia-based consulting engineers. He explained that the Levload tanks were deliberately left out in the open — where their operation is unaffected by exposure to the sun — because the utility's marketing department wanted to showcase them. Customers are frequently shown the tanks and other power-saving features to encourage them to follow suit.

"The regular tours of our data center to highlight our energy-saving techniques have definitely paid off." said Thomas Sales, project manager at Delmarva. "It's no coincidence that a cold-storage system exactly like ours but twice the size has been installed in a nearby Du Pont Co. plant where photographic film is made."

To discourage customers from adding to peak demand, Delmarva charges much more for power consumed during peak periods than at night. On hot weekday afternoons in August, a whopping 35% of all power consumed in the U.S. is for cooling. Other capacity-shy power companies actually pay customers to not add to peak demand by subsidizing them to use gas or steam for chilling. Consolidated Edison Co., the utility serving New York and Westchester County, has allocated $40 million for this purpose for 1990.

Mandell is a New York-based free-lance writer.

Oracle makes move to Unisys mainframes

BY JEAN S. BOZMAN
CW STAFF

After two years of supporting the Oracle Systems Corp. relational database management system on Unisys Corp. Unix machines and desktop personal computers, Oracle has agreed to port its RDBMS to the Unisys 1100/2200 series mainframes by 1992.

Oracle's announcement was just made recently, even as negotiations were ongoing between the two companies to port Oracle to Unisys' other mainframe platform, the A series computers.

The twin projects would allow Unisys mainframes to share equally in a mixed-vendor network of computers hosting multiple Oracle databases.

The Oracle architecture would then allow Unisys mainframes running Oracle to exchange data with Oracle databases running on IBM mainframes or Digital Equipment Corp. VAXs, provided that Oracle's SQLnet communications software is used to link the databases.

"Oracle is doing Unisys an immense favor," said George Lindamood, program director at Gartner Group, Inc.'s industry service in Stamford, Conn. "Unisys was in the strange position of having very good databases that weren't relational. By using Oracle, they're going with something that's almost universally used."

However, porting Oracle to the 1100/2200 is only a first step, Lindamood said. "Unisys needs to put Oracle's SQL front-end tools on their old [proprietary] databases," he said. "That way, they'll get the best of both worlds."

Unisys' Magowan *says users will have Oracle gateways*

Once that happens, network-wide SQL queries would be able to extract data from both the Oracle and Unisys-proprietary databases, according to Lindamood.

The Unisys-proprietary databases include UDS for the 1100/2200s computers and DMS for the A-Series computers.

"There will be a gateway everywhere a user wants one," said Brian Magowan, vice-president of system software at Unisys. "A user of our 2200 machine will be able to implement an application using our own database and our own front-end tools or Oracle's DBMS and Oracle's front-end tools, or a combination of any of these."

Until now, Unisys has written its own "ports" of Oracle to the Unisys U 5000 and U 6000 Unix machines and to personal computers running the Unisys-proprietary CTOS and BTOS operating systems.

However, for reasons of speed and economy, Oracle has agreed to do the porting job for the 1100/2200 mainframes in its Edinburgh, Scotland, facilities. The financial terms of the contract signed by Unisys and Oracle were not disclosed by either firm.

"Oracle is taking their own C code to the 1100," Magowan said. "In the end, the Oracle DBMS and the Oracle tools will be running in native mode under the 1100/2200 operating system."

Users openly asked for the Unisys products at last fall's International Oracle Users Group meeting. "In many cases, these large customers have deployed Oracle throughout their organization, and the Unisys 1100 was one of the only platforms Oracle did not run on," said Gary Botta, Oracle's worldwide manager for Unisys products.

Despite the porting contract, Unisys made it clear that it was not handing over all its database keys to Oracle. The company reserved the right to port other databases to its mainframe platforms and to continue to sell its proprietary databases against the Oracle offerings. "The key to our relationship with Oracle is that it will be complementary rather than competitive," said Roy Jones, program director for large systems software at Unisys.

A 'next generation' for CIM

Semiconductor yields increase up to 50%

BY MARYFRAN JOHNSON
CW STAFF

Digital Equipment Corp., BBN Software Products Corp. and Harris Corp. are collaborating on a "next-generation" computer integrated manufacturing (CIM) system that Harris engineers have used to improve semiconductor yields by 20% to 50%.

The three companies are planning to standardize and enhance, with high-level analytical tools, an integrated plantwide database now in use at Harris, the sixth largest U.S. semiconductor manufacturer. A prototype of the Analysis and Characterization Environment system was displayed late last month at the Semicon/West '90 industry trade show in San Mateo, Calif.

Each year, the semiconductor industry loses billions of dollars because of slight imperfections in chips. Harris officials said that their CIM system, developed in-house with BBN's statistical data analysis software and running on DEC Ultrix computers, could lay the groundwork for a system linking all phases of quality testing, production and design into a single, closed-loop "intelligent" system.

The Unix-based prototype integrates information from Harris' database with a simulated working environment of shop floor equipment using interactive live data. Engineers can access and analyze information online and then correct and manage the manufacturing processes that affect quality and yields.

Initial releases will support only DEC's Unix-based computers and Ingres Corp.'s database product.

IBM boosts Business Recovery Services

BY MAURA J. HARRINGTON
CW STAFF

WHITE PLAINS, N.Y. — IBM recently announced enhancements to its 1-year-old Business Recovery Services program, including the ability for customers to make significant changes to their backup provisions without adjustment charges.

IBM has expanded its services by opening two remote sites for large systems customers and an eighth midrange systems business recovery center.

The Business Recovery Services program was set up to help all IBM customers plan for any type of potential disaster or invasion of their information systems, according to the company.

Under the one-, three- or five-year service plans, customers establish a customized disaster backup plan at a business recovery center, which is equipped with a range of systems, from the IBM System/36 up to the 3090 Model 600J, the company said.

Gerald Ried, a first vice-president of Firstar Information Services Corp., a division of the $8.6 billion First Wisconsin National Bank of Milwaukee, said he subscribed to IBM's Business Recovery Services program last year, choosing it over two other major backup services because IBM ran its facility in almost the same fashion as Firstar.

First impressions

"We're very impressed with the [IBM] facility and with the people running the data center. We ran our first test in March of this year. We shut down the system and redirected our network to IBM's Tampa [Fla.] facility . . . in 10 hours we were up and running," Ried said.

IBM's two new remote sites, located in Chicago and Los Angeles, allow large systems customers to test their business recovery plans and, if necessary, to implement the plans via electronic links to IBM's large systems Business Recovery Services facilities in Tampa or Franklin Lakes, N.J.

"We are trying to focus on four points with this program: state-of-the-art technology, support, responsive terms and conditions and the expansion of customer partnerships," according to Edward Carreiro, IBM's director of Business Recovery Services at the National Service Division.

IBM also increased its contract flexibility to allow a customer to change the backup recovery configurations with one month's notice, at no extra cost, Carreiro said.

Unisys attacks incompatibility

Unisys Corp. recently moved to clean up a nagging incompatibility in the high end of its U 6000 line, introduced in 1988. As part of a recent series of announcements, the firm introduced a new operating system for its high-end U 6000 Models 70 and 80 that is binary-compatible with the rest of its U 6000 line.

Unisys also added its first commercial workstation to the U 6000 series. The U 6000/WS systems, available in July at a price of $8,900, can run both Unix and MS-DOS applications. They employ the Unisys Primary Graphical Environment — Unisys' implementation of the X Window System standard — as well the Open Software Foundation's Motif graphical user interface and the X.Desktop utilities from IXI Ltd. Both support 10M bit/sec. Ethernet, Transmission Control Protocol/Internet Protocol networks and the Network File System protocol.

The UN6100 series uses the 33-MHz Intel Corp. 80386 processor and includes 8M bytes of memory, expandable to 16M bytes. The UN6200 uses the 25-MHz Intel 80486 and can be expanded from 8M to 32M bytes of memory.

Disk arrays

CONTINUED FROM PAGE 25

drive may not be what is expected from traditional DASD, the RAID architecture has a degree of fault tolerance, because it allows for extra drives to take up work and reconstruct data if a drive crashes.

Still, Gordon said, the degree of fault tolerance depends on how many spare drives there are in a configuration. If there is only one, the user is betting that no more than one drive will crash at a time. But, he said, "the cost of each drive is so low, you can afford to throw an extra one, two or three in a box."

One big drawback to RAIDs is the host computer's operating system, according to Kenneth Hallam, president of ENDL Associates, a San Juan Capistrano, Calif.-based market research firm. "Too many operating systems are written with specific disk drives in mind. It's not easy to put a RAID system under an existing operating system. And when you do, every time the operating system vendors come out with a new version, you have to modify it."

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SOFT NOTES

DG's Aviion line gains insurance packages

Data General Corp. announced the porting of three third-party insurance software packages for its Aviion line of Unix-based servers and workstations. The software systems include property and casualty company management from L&L Computer Systems; medical bill review from Armada Software in Cerritos, Calif.; and workers' compensation compliance and health claims automation from Logical Solutions.

Sequoia Systems, Inc. began development on a project to port leading third-party relational database management systems onto its fault-tolerant platform — the only system specifically designed for on-line transaction processing in a Unix environment. To launch its new strategy, the Marlboro, Mass.-based company signed agreements last month with Informix Corp., Oracle Systems Corp. and Unify, an RDBMS firm focused on the telecommunications marketplace.

Access International in Cambridge, Mass., acquired the assets of Management Information Systems and Training, Inc., a municipal market software supplier in Farmington, Conn. Both firms provide applications based on Admins/V32, a Digital Equipment Corp. VAX/VMS-based development tool from Admins, Inc. in Cambridge.

Intergraph Corp. announced a new color image manipulation and editing product called DP/Studio. As part of Intergraph's Distributed Publishing System, DP/Studio offers integrated text, vector and raster manipulation in a single system. It runs only on Intergraph's reduced instruction set computing-based workstations and will reportedly be available in the third quarter for $4,000.

Johnson

CONTINUED FROM PAGE 25

trouble to broadcast it. Where the first benchmark made DB2 look like death warmed over, this latest set of results showed a rosy-cheeked, robust DB2.

So IBM invited the press to come to New York, in twos and threes like a trip to Noah's Ark, to chat with top officials in its mainframe division. IBM also trekked around and briefed the consultants and analysts who do the most public yakking about IBM.

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Why the fuss? They did it all for you, the customer. They did it because you gave them no choice.

In every single large customer account where transaction processing matters — and in how many large accounts does it not? — you customers were asking questions. You were showing the IBM sales representative that Tandem brochure and asking, "What about this, anyway?"

You were reading stories about the Cyclone and noticing those benchmark results in the Tandem ads.

You were even hiring outside consultants and paying for expensive private benchmarking to determine whether DB2 could do the job.

Take heart in the fact that banishing this ghost cost IBM a modest fortune. The company spent months running that motor vehicle department benchmark over and over again in its Gaithersburg, Md., test labs.

IBM also hired a respected benchmark auditing organization, Boston-based CSC Partners, in order to guarantee that everything was above-board and believable.

"If you're going to compete in the high end, you want your systems to be viewed unambiguously," said Peter Burris, an analyst at International Data Corp., a market research firm in Framingham, Mass.

The fact that IBM's top management took all this very seriously indeed was most evident in their choice of Irving Wladawsky-Berger to lead the press and analyst presentations. As assistant general manager of development at IBM's enterprise systems, Wladawsky-Berger is responsible for the overall strategy and development of IBM's largest systems, storage products and System/370 operating system software.

"He is a major player at IBM," Burris noted, "and rolling him out for press briefings is a sure sign of support from the highest levels of the company for this initiative."

"In hindsight, I don't think anyone realized that IBM would be left with as much egg on their face," added Paul Zorfass, an analyst at The Yankee Group in Boston. "They don't typically respond to what other companies are saying, but this was hurting the reputation of DB2 — and IBM's future is tied up in the success of DB2."

What remains to be seen now is how effectively IBM handled its role of ghostbuster.

When it comes to a RDBMS, when faced with the choice of Tandem vs. IBM, the real question for users is: "Who you gonna call?"

Johnson is a *Computerworld* senior writer.

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The On-Line RDBMS

The Sybase View

Business critical on-line applications can dramatically affect the competitiveness of an organization. They require an on-line RDBMS architected to integrate real-time decision support and transaction processing across networked environments.

Historically, RDBMSs were designed only for decision support applications. Many vendors have tried to extend their architecture for on-line capabilities, but lack features critical to success. A true on-line RDBMS demands superior performance, integrity, availability, distributed data management, and integrated tools.

SCALABLE HIGH PERFORMANCE

For the best price performance and absolute performance, an on-line RDBMS must scale up, or down, as business needs dictate. Only an on-line RDBMS with a multi-threaded programmable server architecture has proven successful in handling peak loads, with subsecond response time, for large numbers of users, on a variety of platforms.

SERVER-ENFORCED INTEGRITY

An on-line RDBMS must enforce data security and integrity rules, including referential integrity, *in the database* rather than in each application. This requires an intelligent, programmable server architecture. This architecture dramatically reduces enterprise-wide application development and maintenance time while improving protection and data consistency.

HIGH APPLICATION AVAILABILITY

An on-line RDBMS provides high application availability to avoid costly downtime. It performs backups, recoveries, and database administration changes while applications continue to run. And it supports fault-tolerance with mirrored logs and databases, as well as multi-CPU recovery to minimize exposure to hardware problems.

OPEN DISTRIBUTED DATA MANAGEMENT

An on-line RDBMS fully supports an open client/server architecture that lets you transparently distribute applications and databases over networks of multiple heterogeneous workstations and/or computer systems. It includes a two-phase commit service to support distributed update transactions, as well as retrievals, across two or more servers. And it provides open interfaces for integrating third party tools as alternate clients and foreign data sources as alternate servers for a truly open computing solution.

ADAPTABLE WINDOWING TOOLS

An on-line RDBMS gives developers a set of window-based 4GL tools that are object-oriented, event-driven and portable. And it integrates these tools with the power of the programmable server. In addition, an on-line RDBMS gives users a set of window-based decision support tools that provide real-time access to live data with a highly intuitive graphical user interface.

ONLY ONE RDBMS DELIVERS ALL THESE FEATURES—TODAY

SYBASE preserves and protects your hardware and software investments while allowing your organization to grow. SYBASE gives you window-based decision support tools along with a powerful, integrated 4GL development environment; you write applications once and know that they're fully portable to a wide variety of platforms. And SYBASE provides an open client/server architecture that fulfills the promise of the on-line enterprise.

SYBASE. Architected from the outset as the on-line RDBMS.

THE SYBASE FORUM

This view of The Open RDBMS first appeared in The Sybase Forum (Computerworld, April 2, 1990).

We'd Li
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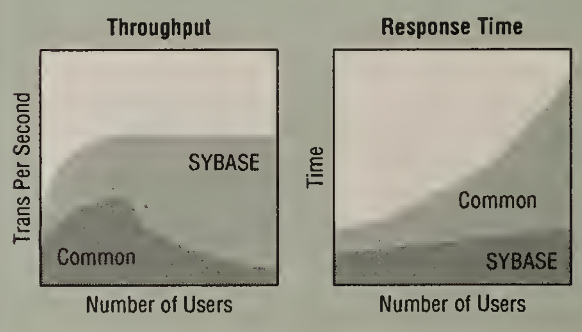
The O

SYBASE SQL Server® delivers the high throughput and fast response times needed for on-line applications. Moreover, SQL Server maintains performance levels as the number of users and the size of the databases grow.

SYBASE performance is based, in part, on a multi-threaded server architecture that includes its own kernel and SQL task manager that are optimized to handle multi-user functions usually associated with the operating system. In addition, the SYBASE SQL Server architecture

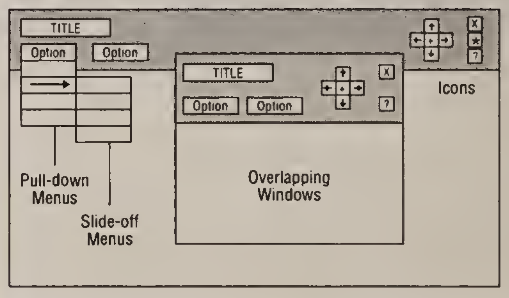


SYBASE maintains maximum transaction throughput and fast response times over an extended range of users.

The on-line enterprise cannot afford an RDBMS that must periodically be taken off-line for routine maintenance activities, such as database backups, diagnostics, design, and integrity changes.

SYBASE SQL Server allows all such activities to be handled on-line, with system-supplied stored procedures, while applications continue to run.

SQL Server also protects against hardware problems by supporting *software-based* fault tolerance with mirrored logs and databases, as well as multi-CPU recovery.



SYBASE provides a highly intuitive graphical user interface to maximize productivity for developers and end-users alike.

SYBASE boosts productivity with powerful window-based tools that meet the needs of all users. Programmers get a state-of-the-art fourth generation language (4GL) programming environment. Overlapping windows, pull-down and slide-off menus, and icons help developers build complex, on-line applications in a fraction of the time it takes using traditional tools.

In addition, SYBASE offers a complete SQL life-cycle toolset for developers. All phases are supported, including design, prototyping, development, testing, administration, and maintenance.

ke To Add Some
tive To Our View Of
n-Line RDBMS.

has been extended to take full advantage of symmetrical multiprocessor (SMP) hardware systems. The resulting benefits are greater throughput, more effective load balancing, extended multi-user capacity, and efficient operational control.

In Computerworld (March 5, 1990, "Buyer's Scorecard") SYBASE ranked first in eight out of eighteen categories, including "Performance in processing on-line transactions" and "Performance in decision-support applications."

One of New York's most respected investment research and management companies, Sanford C. Bernstein & Co., chose SYBASE because "Of all the systems we evaluated, SYBASE was clearly the fastest. It accommodated multiple users without losing performance and offered the most functionality both on the transaction processing end and the data management end."

The on-line enterprise demands data and application integration and interoperability in a multi-vendor environment — *SYBASE Open Client/Server Architecture provides exactly that.*

SYBASE Open Client permits the use of a variety of front-end tools or applications, including SYBASE applications, independent software vendor's tools, and user written applications. SYBASE Open Server can seamlessly integrate hierarchical and relational DBMSs, third-party applications and real-time data feeds into SYBASE applications.

General Logistics International (GLI) is using SYBASE to help manage and distribute the volumes of data generated daily by one of the largest and busiest container carriers in the shipping industry—Mitsui/O.S.K. Lines North America. "The ability to distribute data among various locations combined with flawless data integrity when distributing that data was key to choosing SYBASE."

In the real, multi-vendor world, SYBASE preserves your prior investment in both hardware and software. SQL Server supports portability to a wide range of computing platforms, including VAX/VMS, UNIX, and OS/2, with PC and MAC connectivity, making it a natural for linking applications residing on different machines.

SYBASE

Client/Server For The On-Line Enterprise
For more information or seminar reservations, call 1-800-8-SYBASE.

This is what InfoWorld (March 5, 1990, "Dueling Servers") had to say about SQL Server's referential integrity: "The more power a multiuser relational database system has, the more potential there is for disaster. If you change a number on one table, any other table that depends on it may need to be changed. The risk lies in the failure to update all the appropriate related tables. The likelihood of this increases even more as more front-end applications that access the same data are added to the system.

"SQL Server offers effective countermethods. Its triggers, a type of stored procedure that executes whenever a given condition occurs, are attached physically to a table...and check all updates, inserts, or deletions for their effect on related tables. Since the trigger is installed at the server level — and not run through the front-end application — it doesn't matter which application updates the critical table. This is a critical feature as front ends multiply, and the potential for mismanaging data is increased. And since a given trigger need only be written once, at the server, it makes data integrity programming easy."

A final note: InfoWorld rated SQL Server referential integrity "excellent."

SYBASE SEMINAR SCHEDULE/JUNE-AUGUST, 1990

From every angle, it's clear that the on-line RDBMS is a critically important tool for today's management.

So please join us for a free seminar. We'll explore a host of on-line issues in greater depth, and present a demonstration of SYBASE's on-line transaction processing and decision support capabilities.

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Minneapolis	July 11
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NEW PRODUCTS — SOFTWARE

Utilities

Innovative Computer Systems, Inc. has announced enhancements to its FCX and PC-FCX file compression software for Digital Equipment Corp. VAX/VMS and MS-DOS systems.

FCX Version 3.0 and PC-FCX Version 2.0 offer 40% to 50% faster compression, the ability to translate between VMS and MS-DOS character sets for foreign language characters and support for compressed files that span multiple disks.

Pricing for FCX ranges from $495 to $1,800, depending on VAX model. A single-copy version of PC-FCX costs $149. Site licenses, a 30-day evaluation kit and multiple copy and cluster discounts are also available.

Innovative Computer Systems
1040 N. Kings Highway
Cherry Hill, N.J. 08034
609-779-1422

BMC Software, Inc. has released a version of its Pointer Checker Plus that includes features for analyzing, monitoring and repairing databases.

Version 2.0 validates pointers with a Hash Checking Technique, which runs during the image copy process, and a Full Checking Technique, which runs faster than IBM's Space Management Utility function, the vendor said. A Database Zap Utility displays, alters or verifies data and prefix database segments.

A perpetual license for Pointer Checker Plus costs from $12,000 to $46,000, depending on type of CPU.

BMC
P.O. Box 2002
Sugar Land, Texas 77487
800-841-2031

Systems Center, Inc. has announced a product designed to automate console management for multiple SQL/DS database machines.

DB/Admin for SQL/DS serves as a central administrative platform for SQL/DS database administrators. The product enables database administrators to observe multiple screen activity from a single console. Its archive system enables database managers to automatically perform scheduled, user- and system-initiated archiving, the vendor said.

Pricing ranges from $2,800 to $10,000, depending on CPU model group. Permanent and three-year licenses are available.

Systems Center
1800 Alexander Bell Drive
Reston, Va. 22091
703-264-8000

Development tools

Ready Systems has introduced a real-time software development and run-time environment for single, multiple or networked microprocessors.

VRTX Velocity provides a turnkey development and debugging environment for software designers developing VRTX32-based real-time embedded systems applications.

The product is available for Sun Microsystems, Inc. Sun-3 workstations targeting Motorola, Inc. 68020 and 68030 family processors. It can also be used on Force Computers' 130 VME board and the VME-133 board from Themis Computers. Prices start at $19,970 for a single-user system.

Ready Systems
470 Portrero Ave.
Sunnyvale, Calif. 94086
408-736-2600

SQL Solutions, Inc. has announced two products designed for SQL developers and system administrators.

SQL Advantage is a programmer productivity environment that facilitates writing and debugging of SQL code for multiple relational database management systems.

SA Companion is an integrated operational control environment designed to help Sybase system administrators manage SQL Server networks.

Pricing for SQL Advantage ranges from $7,500 to $35,000, depending on machine class and number of users. SA Companion costs between $5,000 and $25,000, also depending on machine class and configuration.

SQL Solutions
8 New England Executive Park
Burlington, Mass. 01803
617-270-4150

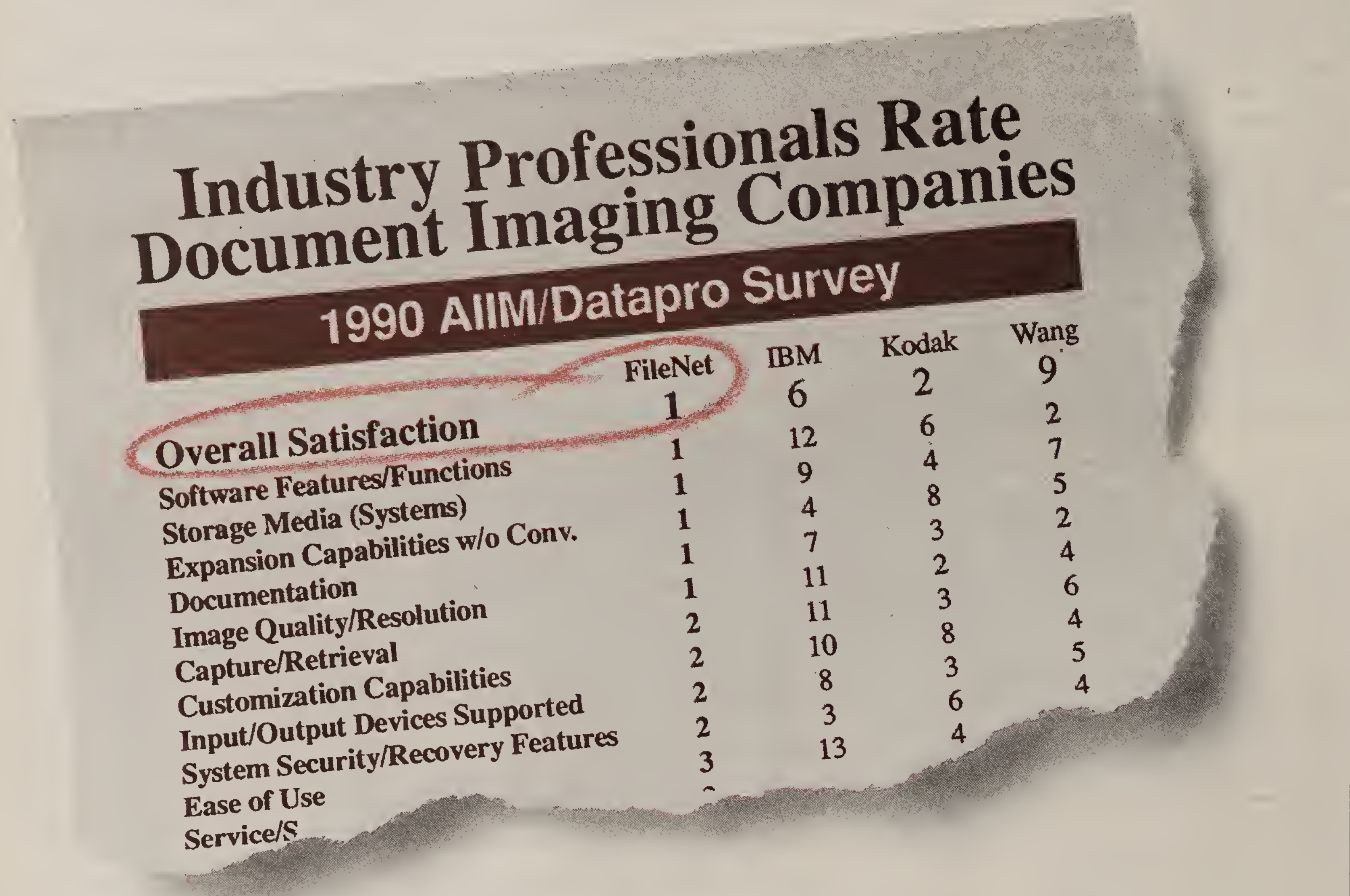
System software

BGS Systems, Inc. has announced a performance reporting and captivity planning software package designed for Digital Equipment Corp. VAX/VMS systems.

Capture/VMS reads and analyzes VMS performance data and generates reports that indicate clusterwide and node-by-node usage of hardware devices for individual VAXs and Vaxclusters. The product allows sites to define work loads and transactions and get reports showing calculated throughputs and response times for VAX users, according to the vendor.

Pricing for VAX installations ranges from $20,000 to $40,000, depending on configuration.

BGS
128 Technology Center
Waltham, Mass. 02254
617-891-0000



Industry Professionals Rate Document Imaging Companies

1990 AIIM/Datapro Survey

	FileNet	IBM	Kodak	Wang
Overall Satisfaction	1	6	2	9
Software Features/Functions	1	12	6	2
Storage Media (Systems)	1	9	4	7
Expansion Capabilities w/o Conv.	1	4	8	5
Documentation	1	7	3	2
Image Quality/Resolution	1	11	2	4
Capture/Retrieval	2	11	3	6
Customization Capabilities	2	10	8	4
Input/Output Devices Supported	2	8	3	5
System Security/Recovery Features	2	3	6	4
Ease of Use	3	13	4	
Service/S				

IN AN INDUSTRY WHERE IMAGE IS EVERYTHING, FILENET® RANKS #1

Recently, the Association of Information and Image Management (AIIM), together with Datapro Research, conducted a survey of over 1,700 information industry professionals. They rated FileNet Number One over some very impressive companies. Companies like IBM, Wang and Kodak.

FileNet makes imaging work

Maybe they were impressed that FileNet systems are built on an open architecture, allowing a variety of computers to access and store images, data and text of any type on a FileNet system.

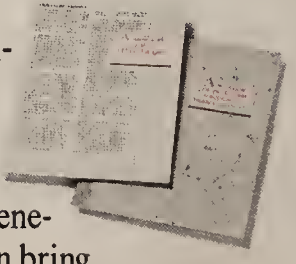
Or perhaps it was FileNet's WorkFlo® family of application software, the key to automating business applications that manage and process large volumes of incoming documents and files.

Most likely, it was because FileNet has the best track record of successful production installations of any image processing company in the world. In fact, FileNet customers recently received four out of eight BIS/CAP awards for imaging excellence... including first place for American Airlines.

If you're interested in image processing, shouldn't you talk to the imaging company with the most satisfied customers?

Free report

Conduct some research of your own. For the story behind the AIIM/Datapro survey, call or write FileNet Corporation, 3565 Harbor Blvd., Costa Mesa, CA 92626, 714-966-3900.



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☐ Corporate purchaser
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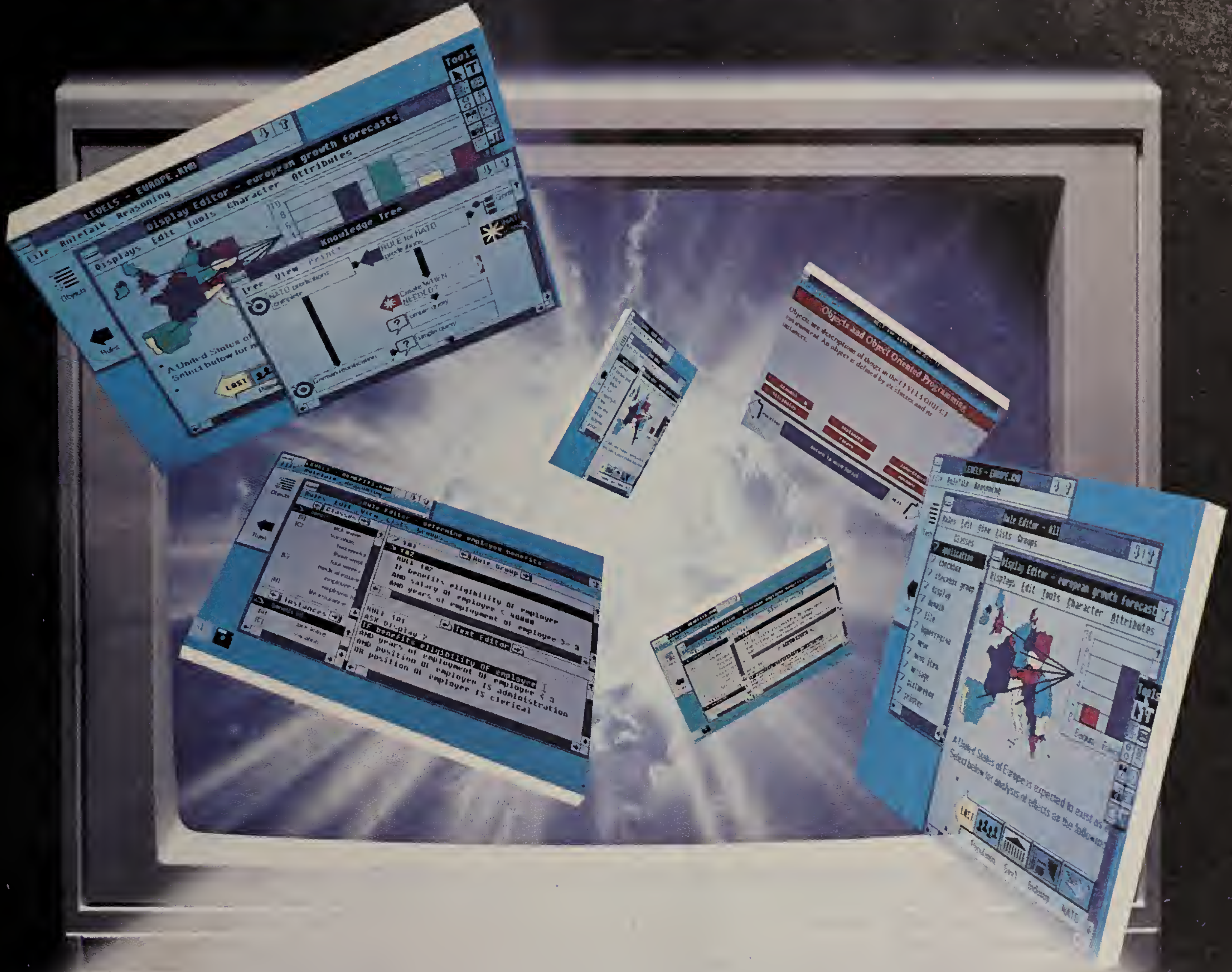

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Goal Systems

Photos courtesy of NASA and Richland College, Dallas, Texas

NEW PRODUCTS — HARDWARE

Processors

Applied Digital Data Systems, Inc.'s Systems Division has added two products to its Mentor Computer Systems family.

The Mentor 7000 Models 3/20 and 5/20 are based on the NCR Corp. Tower platform and incorporate 32-bit Motorola, Inc. 20-MHz 68030 processors.

Model 3/20 uses from 4M to 32M bytes of random-access memory and has a hard disk capacity of 1G byte. Model 5/20 supports 64M bytes of RAM and offers 7G bytes of hard disk storage.

The 3/20 model costs from $25,000 to $175,000; the 5/20 ranges from $38,000 to $300,000, based on configuration.

Applied Digital Data Systems
100 Marcus Blvd.
Hauppauge, N.Y. 11788
516-231-5400

CSP, Inc. has announced a line of software and hardware systems integrated to accelerate signal processing tasks on Digital Equipment Corp. hosts.

The S series of vector multiprocessors includes an intelligent interprocessor bus offering a maximum data transfer rate of 116M bit/sec. Up to eight vector processing nodes can be installed on a DEC Qbus, giving single and multiple users 40 million to 320 million floating-point operations per second, the vendor said.

A two-node unit with all necessary hardware and software costs $65,000.

CSPI
40 Linnell Circle
Billerica, Mass. 01821
617-272-6020

Data storage

Decision Data, Inc. has announced the DDCC 7490, a ½-in. cartridge subsystem that includes an automatic cartridge loader with up to 4G bytes of capacity for data compression.

The product can automatically load up to 10 ½-in., 18-track cartridges when used with an optional stacker loader. Its universal controller design enables users to connect nine-track drives, reel-to-reel drives and 8mm cartridges to an IBM midrange system, the vendor said.

The list price for a basic configuration is $45,900.

Decision Data
410 Horsham Road
Horsham, Pa. 19044
800-523-5357

Laser Magnetic Storage International Co. has announced two members of its 4000 series of compatible optical-storage devices.

The LD 4100 has independent heads and actuators on each side of a double-sided media, and its dual heads provide an online drive capacity of 5.6G bytes.

The LF 4500 Rapidchanger stores 28G bytes on five cartridges in a portable magazine. Its shuttle mechanism can reportedly exchange cartridges in less than three seconds.

The LD 4100 and Rapidchanger cost $12,000 and $16,000, respectively.

Laser Magnetic Storage
4425 Arrows West Drive
Colorado Springs, Colo. 80907
719-593-7900

I/O devices

Ideassociates, Inc. has introduced its Idea 12000 family of modular displays for IBM mainframes and midrange systems.

The devices can be configured for mainframe or midrange terminals by inserting coaxial- or twin axial-compatible plug-in logic modules. Each display incorporates a monitor, a logic board with a custom very large-scale integration chip, a tilt/swivel base and a keyboard. The 12000 family includes two 14-in. models (Idea 471 and Idea 472) and two 15-in. devices (Idea 572 and Idea 572C).

Pricing ranges from $995 to $1,595, depending on model.

Ideassociates
29 Dunham Road
Billerica, Mass. 01821
508-663-6878

NCR Corp. has introduced an integrated bar-code scanner scale designed to help retailers improve their customer service.

The NCR Pacesetter Scanner Scale reportedly provides up to a 10% increase in first-pass reading of universal product codes and European article numbers. Its makeup includes digital signal processing, which enables part of a label to be read and assembled into a readable bar code.

The product lists at $3,885.

NCR
1700 S. Patterson Blvd.
Dayton, Ohio 45479
800-225-5627

Interface Systems, Inc. has introduced a printer designed for coaxial attachments to IBM mainframes.

The ISI 8262-D12 produces solid-formed, letter-quality output at a rate of 1,150 line/min. It can handle continuous fanfold forms with up to six parts from 3- to 16-in. wide and includes four bidirectional tractors for horizontal and vertical paper alignment. It also has automatic paper pullers and stackers to minimize jams.

The list price is $12,000.

ISI
5855 Interface Drive
Ann Arbor, Mich. 48103
313-769-5900

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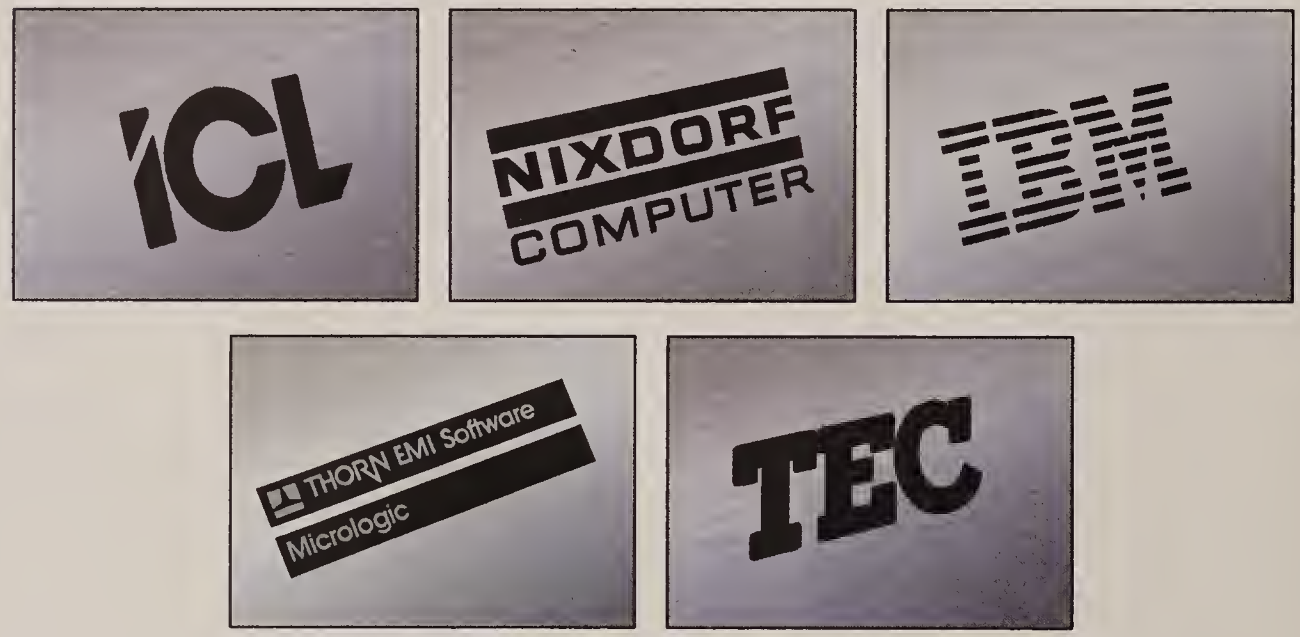

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PCs & WORKSTATIONS

MICRO BITS

Charles von Simson

The reality of Windows

Like a 19th-century lumberjack anxiously awaiting his mail-order bride, often to be disappointed on delivery, Windows users may find that their imaginations have run away with them.

While the interface — like the photo of the bride — is a beauty, it has some genuine faults. The reality of what it can't offer may finally give some life to OS/2.

The disillusionment is going to come first from DOS's lack of support for all but the most rudimentary multitasking. Windows is now a complete environment to rival Apple's Macintosh, but like the Mac, it is missing something that users do not yet know they need.

What office worker in America could not use the capability to print a long document while using his word processor or spreadsheet, while his electronic mail package flashes at him when a message comes in, rather than when he is finished? None of this stuff is fancy, but it simply can't happen under Windows because it can't happen under DOS.

OS/2 apologists have said

Continued on page 44

Users shy away from upgrades

ANALYSIS

BY RICHARD PASTORE
CW STAFF

More personal computer manufacturers are designing CPU-upgradable boxes to entice the cost-conscious customer. However, although they praise the concept for its flexibility, many users appear unwilling to take advantage of the upgrade opportunities.

The idea of swapping one processor board for another to create a more powerful PC has been around since the mid-1980s. The latest company to experiment with upgradability is NCR Corp., which unveiled its Intel Corp. I486 upgrade last month.

As budgets have tightened, the need to economize has magnified users' fears of early obsolescence. "Technology is changing so quickly, you're almost afraid to make a decision on something," said Dennis Melville, vice-president of information services at Big V Supermarkets in Florida, N.Y.

Despite such concern, few information systems managers contacted by *Computerworld* said they were ready to take advantage of the upgrade path. Rather, many preferred to pass the slower PC to a new user and replace it with a whole new box.

"It generally turns out that when we're ready for an upgrade, I have a home for the other machine," said Melvin Boyer, director of MIS at Louisiana-Pacific Corp. in Portland, Ore. Most of Boyer's 500 PCs are upgradable AST Research, Inc. boxes.

"We usually buy a new PC and take the old machine and find a use for it," said Paul Tumolo, director of academic computing at California State University at Hayward. Tumolo has purchased several PCs from Everex Systems, Inc., but not the upgradable models the company offers.

Relying solely on this hand-me-down strategy to protect PC investments is "shortsighted," said George Thompson, an analyst at Datapro Research Corp.

Continued on page 44

Swap meet

A sampling of the PC upgrade paths from vendors shows a variety of choices and prices

Company	Upgrade from:	Upgrade to:	Price
ALR	12.5-MHz 286	25-MHz 486	$1,995
AST	16-MHz 386SX	33-MHz 486	$7,695
IBM	25-MHz 386	25-MHz 486	$3,995
NCR	20-MHz 386SX	33-MHz 386	$3,500

CW Chart: John York

Mellon Bank enjoys life with image handling

BY SALLY CUSACK
CW STAFF

PITTSBURGH — A desktop image handling and screen-capture software system designed specifically for use with OS/2 Presentation Manager is making life a bit easier for an OS/2 development group at Pittsburgh's Mellon Bank NA.

The bank is working on an OS/2-based executive information system (EIS) for some of its larger customers. Mellon already has a DOS-based EIS active at about 20 customer sites nationwide.

As a member of the OS/2 product development team, systems coordinator Mark Frederickson's responsibilities include writing a user interface for Presentation Manager to insert into the new EIS. He is using Collage PM, an image handling package from Inner Media, Inc. in Hollis, N.H., to provide the screen print functions lacking under Presentation Manager.

"I was trying to write specs to give to a programmer, who would in turn build me a dialogue box to be included in the product," recalled Frederickson, acknowledging that the process was difficult because there is "no concept of a screen print function under Presentation Manager."

After reading an article in a trade magazine that compared various screen-capture products in the DOS environment, Frederickson called through the list and asked the vendors if they had anything similar for the Presentation Manager platform, eventually hitting on Collage PM.

According to Frederickson, the package is easy to install and contains a fairly typical Presentation Manager interface, making for a relatively short learning curve. He estimated that it took him about 30 minutes to feel comfortable with the software.

The package allows images to be cropped, gray-scaled and converted for transporting data from one graphics application to another; other functions include locate, view, capture, rename, copy and delete capabilities.

It also contains a timer function, which allows the user to clean up or rework the screen before the picture is taken.

The Mellon Bank OS/2 development group said it anticipates using the software to assist in the user documentation process by taking pictures of each individual screen for inclusion in the user manuals.

Collage PM is available in both 5¼- and 3½-in. disks and carries a retail price tag of $199.

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June 14th	Baltimore, MD
June 19th	Kansas City, MO
June 26th	Columbus, OH

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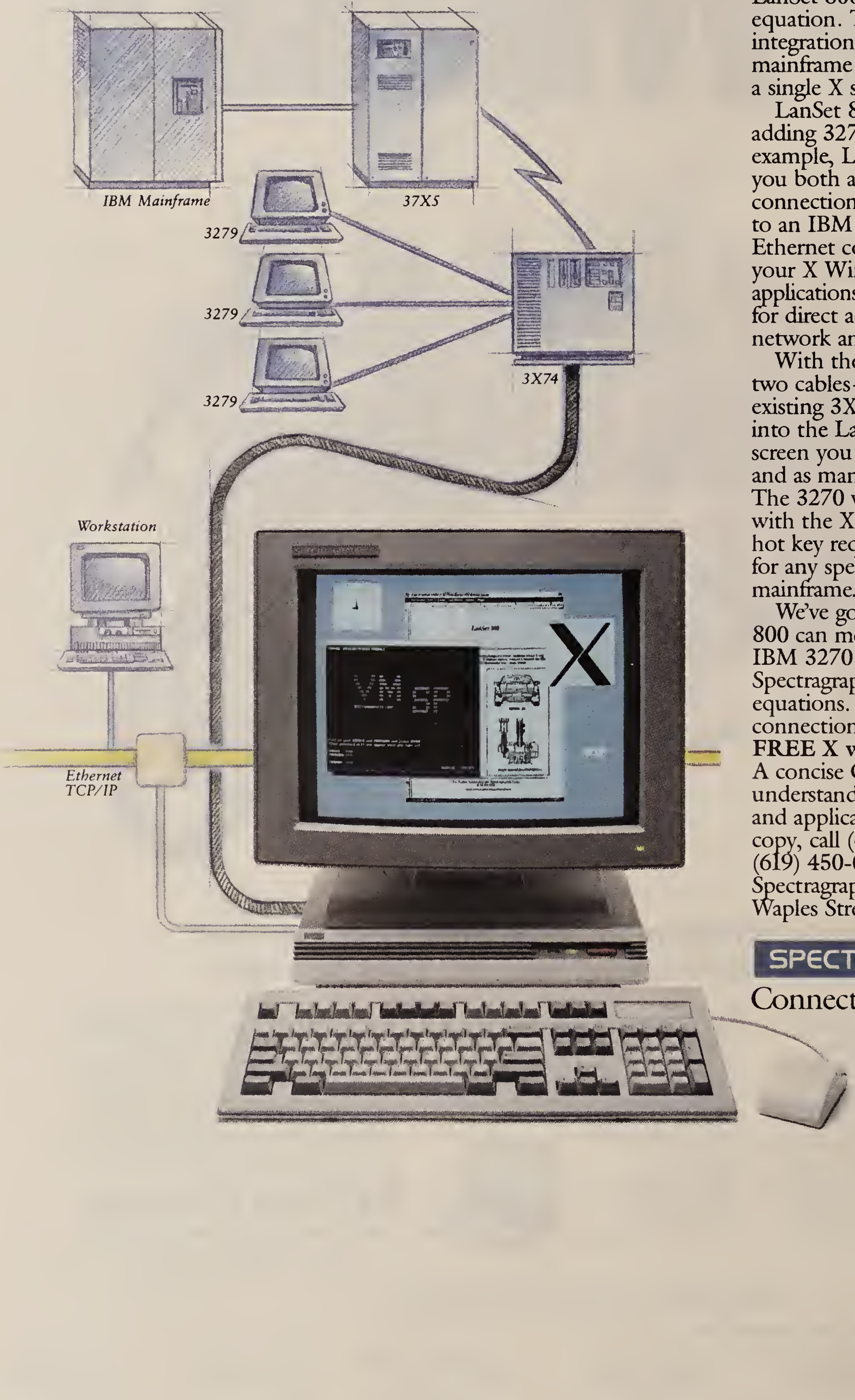

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Keeping track — a lot smaller

American dumps mainframe scheduling system, goes to workstations

ON SITE

BY JAMES DALY
CW STAFF

DALLAS — If it's windy in Waco or pouring in Poughkeepsie, Scott Nason wants to know about it.

In his role as managing director of operations planning at American Airlines, Nason needs a quick turnaround on any meteorological information that is going to keep planes or crews delayed or in the hangar.

As a result, Nason is on final approach in a switchover from American's shared central mainframe to a more individualized workstation and personal computer-based crew and flight scheduling system. The new arrangement will not only streamline the airline's labyrinthian crew scheduling task but also will allow trackers to stay atop a flight itinerary that may change dozens of times per day.

"We are constantly struggling with optimization problems that are just about impossible to optimize," Nason said.

Previously, computing power came from an IBM 3090 mainframe at American's computer center in Tulsa, Okla. Because of the time-sharing nature of the arrangement, however, it could take Nason's group a full day to rewrite one of the complex monthly catalogs that team available planes with scheduled flights. "We sometimes massage these pairings several times before coming up with an optimal schedule," project coordinator Jack McKerman said.

The drag was so irritating that Nason said he had considered buying time on a supercomputer or purchasing a dedicated minicomputer.

Instead, Nason's sector now runs its Crew Allocation System on a system of Mips Computer, Inc. RS2030 workstations networked to a pair of RC3240 deskside servers, one of which serves as a communications gateway to the 3090 in Tulsa. The on-screen movement by programmers is simplified through the use of the OSF/Motif graphical user interface.

American Airlines *moves to workstations to schedule its crews and flights*

American's 8,000 pilots and 16,000 flight attendants sign up for three-day flight legs, after which they get four days off.

While much of the schedule remains consistent, even a small change can have drastic implications on an airline that flies 70,000 legs a month. "If 20% of the flights change, it can ripple through 80% of the flight schedule," Nason said.

A second PC system based on a series of Apple Computer, Inc. Macintoshes is used to rearrange daily flight and crew pairings on the fly. A canceled or delayed flight or crew can easily foul up even the most finely crafted daily schedule, Nason said.

So far, both of the systems have touched down softly. Nason says he estimates that American could save up to $5 million in computing costs alone over the next five years — "not bad for a system that cost less than $1 million to install," Nason said.

In Scott Nason's book, that's full throttle ahead.

HP/Apollo tandem set first product

The first joint product to come out of the Hewlett-Packard Co./Apollo Computer merger, a workstation running the Unix operating system, will be announced next month.

The new system is based on Motorola, Inc.'s 68030 processor, with an upgrade to the 68040 reportedly set for late this year. HP officials said that when it is upgraded, it will run about 40 million instructions per second (MIPS), but the company would only allow that the first entry would be around the 12-MIPS range.

Both HP and Apollo currently sell workstations based on the 68030. The new workstation is expected to be priced lower than the HP 9000 Model 345, a 12-MIPS workstation that HP began selling earlier this year — which is also upgradable with a 68040 — for about $9,000. Apollo's comparable workstation, at 8 MIPS, is two years old and costs about $18,000.

Imaging effort to save exploration materials

BY PATRICIA KEEFE
CW STAFF

SEVILLE, Spain — The Spanish Ministry of Culture is using IBM's image processing technology to draw a bead on the preservation of more than eight million fragile documents and maps related to Spain's exploration of the New World.

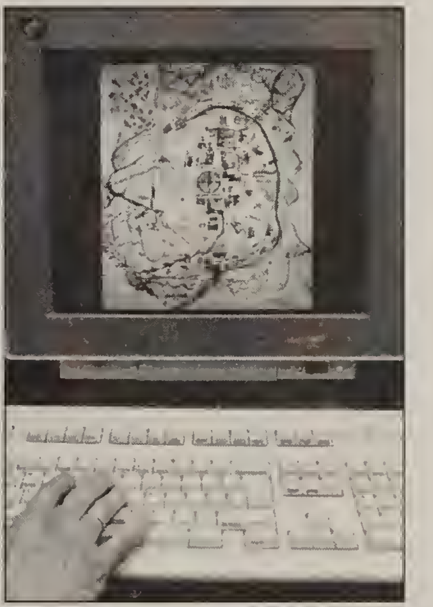
IBM has teamed up with several Spanish cultural organizations in an effort to electronically capture about 10% of the contents of the Archivo General de Indias, which extends across 5.6 miles of shelves and includes 82 million document pages and about 7,000 maps and drawings.

The images generated by the six-year project are expected to fill 3 terabytes of storage and handle 40% of the queries directed at the Archivo, according to Victor Martinez, IBM's scientific center manager.

A look on Columbus Day

A computerized display of some of these historical documents will be unveiled during the Oct. 12, 1992, celebration of the 500th anniversary of Christopher Columbus' first voyage to the Americas.

The project is underwritten in part by donations of technology and time from the IBM Spain Scientific Center in Madrid and through financial support from Spanish organizations.



Spain acts *to preserve historic Columbus-era documents*

IBM will design, code and implement the system, which will be based around an IBM Application System/400 networked via IBM's 16M bit/sec. Token-Ring to a number of optical disc servers, Xerox Corp. optical scanners and 60 OS/2 Extended Edition-based IBM Personal System/2s, mostly Model 80s.

Most appropriate

Use of the Micro Channel Architecture (MCA) bus-based PS/2s is not overkill, according to Martinez.

"Images require a lot computing power to compress, decompress and display," Martinez said. While MCA also provides speed, the system relies on OS/2 to provide access to sufficient memory.

The system not only has to enable researchers to navigate their way through databases with indexes and book "signatures" but also must be able to duplicate the order of the approximately 43,000 "bundles" into which the archive's documents are divided.

"The researcher will be able to browse through an electronic bundle much in the way he would with paper," Martinez said.

The image software that IBM is writing accommodates color and black-and-white documents. After 2½ years, it is 95% finished and features 100 dot/in. and four bits per pixel, he added. When completed, the system software is also slated to include an SQL database of images, administrative software and an electronic "card catalog" of the images.

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Upgrades

CONTINUED FROM PAGE 39

in Delran, N.J. "What happens when the company is saturated with PCs? Then what are you going to do?" Thompson asked.

Boyer predicted that his firm will reach PC saturation in about a year. Though upgradability was not a criterion for his earlier AST purchases, "it would definitely have an influence on my purchase decision" in the future, he said.

Boyer and other users said they feel more comfortable with an upgradable box whether they have need of it or not. "They're giving people more flexibility and more for their dollar. That's a great idea," said Robert Goldberg, vice-president at Old Stone Bank in Warwick, R.I.

However, Goldberg and others were quick to add that board-swap upgrades can be prohibitively pricey. "If the cost of the processor would come down, I'd be more interested," Goldberg said. "Right now, it's hard to justify."

"By the time the upgrade becomes cost-effective, we're already buying the new machines that use that chip," Tumolo said.

Even some vendors admit that their upgrade boards have been expensive. ALR initially included so many components on its upgrade board that the unit sold for nearly half the cost of a new system.

> "TECHNOLOGY IS changing so quickly, you're almost afraid to make a decision on something."
>
> DENNIS MELVILLE
> BIG V SUPERMARKETS

"The customer doesn't want that," said Dave Kirkey, vice-president of sales and marketing at ALR.

ALR has since stripped down its upgrade boards and cut prices by two-thirds. About 30% of ALR's Intel 80286 system customers have purchased the 80386SX upgrade module, Kirkey said.

Vendors who do not offer upgradability argue that swapping the CPU is not enough. Unless a customer buys a whole new system, advances in disk drive technology and other system components will render the PC obsolete, according to Compaq Computer Corp. But observers say there are two sides to the story.

"The Compaq argument is not true for everybody," said Stephen Smith, an technology research analyst at Paine Webber, Inc. in New York. "If all you want to do is run Windows faster, maybe all you need is a 486 chip in an AT chassis."

Though having faster disk drives may be desirable for some, "the processor speed is what you'd be interested in if you're dealing with processor-intensive applications," Melville said.

Despite the debate, more vendors will design upgradability into their new PCs, analysts generally agreed. "More companies will offer it because it's a way to differentiate your product line and keep customers on the reservation," said Paul Zagaeski, an analyst at The Yankee Group in Boston.

Von Simson

CONTINUED FROM PAGE 39

that the reason the system is not taking off is that it is difficult to show the benefits of the required hardware upgrade on personal productivity applications. Performance enhancements from multithreaded spreadsheets and desktop publishing packages haven't hit users where they live. Part of that enormously difficult problem is that they have been trying to show the benefits in the wrong places.

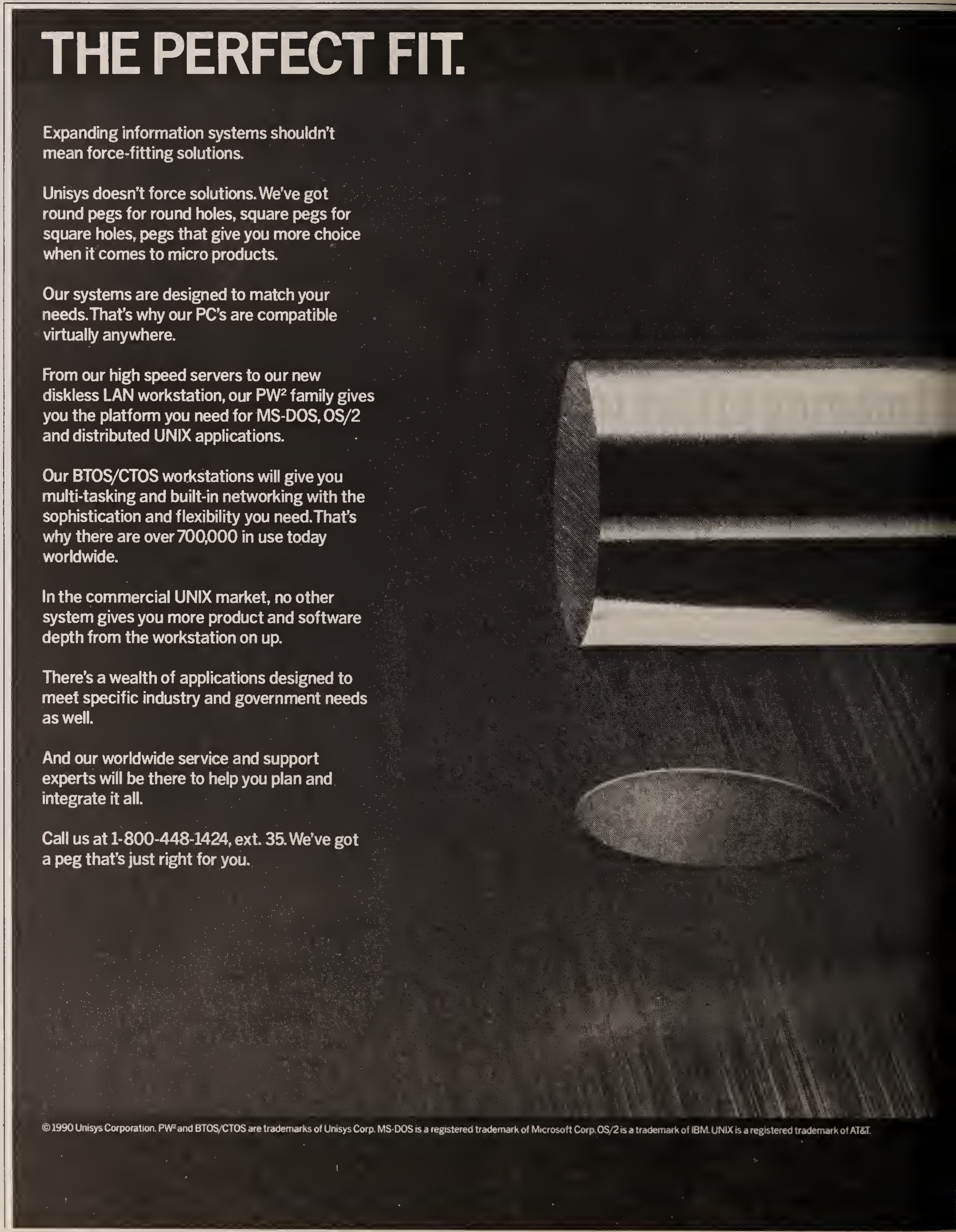
A spreadsheet operating on a number of logical threads is probably too esoteric a demonstration to capture the imaginations of all but the most die-hard users. But showing the capability of your PC to "ring" with an electronic message while doing some blinders-on Lotus calculations would accelerate the intersection of OS/2's functionality and price.

One thing in OS/2's favor is that this kind of function is not coming any faster to Unix environments at prices suited to the average user. Developers have really just started to think about OS/2's communications potential; once they get Windows out of their systems, they are likely to start programming for it in earnest.

Studies showing high costs for moving from character-based DOS to graphically based Windows typically ignore the facts that most Fortune 1,000-class shops are not upgrading from 8088s; the software will come bundled with many new systems; and, with a three-year depreciation cycle for most corporate PCs, users are constantly being refitted. Also, on systems between 1M and 2M bytes — the majority of machines currently shipping — Windows is the only game in town. The firm has produced a viable interface for the PC masses.

So don't cry for Windows, still blushing and untouched by the hard eyes of the industry. Microsoft knows that there is a vast price-sensitive home and small business market just waiting for a young, strong offering. Out of desperation, that market is likely to ignore for the moment the fact that Windows isn't absolutely everything its heart desires.

Von Simson is a *Computerworld* West Coast senior correspondent.



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Wang extends warranty on mail-order PC line

BY RICHARD PASTORE
CW STAFF

Only three months after introducing a line of mail-order personal computers, Wang Laboratories, Inc. upped the ante late last month by tripling the length of its warranty and free on-site service to three years. Users said the extended warranty is attractive, but analysts called it a doubtful tactic to shore up a weak operation.

"I think they're trying to get more aggressive because they haven't been selling as well as they anticipated," said Seymour Merrin, a distribution consultant and president of Merrin Information Services in Palo Alto, Calif. "The mail-order guys are working on too thin a margin to give anything away unless they have to."

Analysts said the three-year warranty, triple the average contract offered by major mail-order vendors, will be good for users. However, both analysts and users said price is still the main factor influencing purchasing decisions.

"We would love to have a three-year warranty, but that alone wouldn't make me buy from Wang," said Ted Kinsley, a computer analyst at Chicago-based printer R.R. Donnelly & Sons Co.

Though Wang's mail-order arm also announced a 5% across-the-board price cut last week, observers noted that the prices are not that competitive with other mail-order firms.

Some users said they may be willing to overlook a little extra cost to get the extended coverage. "Even if the PCs are priced a little higher, I think it would still be attractive," said John Quass, data processing manager at Rockwell Graphic Systems in Cedar Rapids, Iowa.

Still, observers do not expect Wang's warranty to make a big difference in its PC fortunes. "I don't think it's going to affect their market share one way or the other," said Jack Karp, an analyst at Meta Group, Inc. in Westport, Conn.

Intel reveals its plans for I586

BY CHRIS BARTON
SPECIAL TO CW

AUCKLAND, New Zealand — Intel Corp. expects to introduce the four million-transistor I586 microprocessor by 1993 and also plans an I686 with 22 million transistors by 1996 and an I786 chip with 100 million transistors by 2000.

Intel Australia Managing Director Bruce Patterson recently told attendees at the Compaq Technology Forum in Sydney that the 32-bit 80386 architecture "has made it possible to have PCs that are real computers" and that the 386 architecture is a complete architecture with room to grow "all the way to 2001 and beyond." Patterson said he believes the 1990s will herald a migration to a new standard — the full 32-bit platform, where CPUs and all auxiliary functions, I/O buses and software will be 32-bit.

Patterson said the 386 was the first implementation of this architecture, followed by the I486 with its full binary, forward and backward compatibility with the 386 processor. He stressed that the I486 implements the 386 architecture and that such stability will provide a solid platform for the future. Intel expects to announce a 50-MHz version of the I486 by the end of the year, Patterson added.

Patterson also revealed some of Intel's projections about the kind of microprocessor it could produce by 2000. Intel engineers have dubbed this chip the Micro 2000 and expect it to be about 2.5cm by 2.5cm and to contain 100 million transistors. It is expected to integrate four CPU execution units with five million transistors per unit operating in parallel.

There will also be two vector units operating in parallel with 10 million transistors; a graphics and self-testing sector, each with five million transistors; and a cache storage area of 40 million transistors. Patterson said the chip will employ "CISC, RISC, fine-grain parallel processing and probably a lot more of those kind of acronyms and buzzwords."

Barton is a reporter at Computerworld New Zealand.

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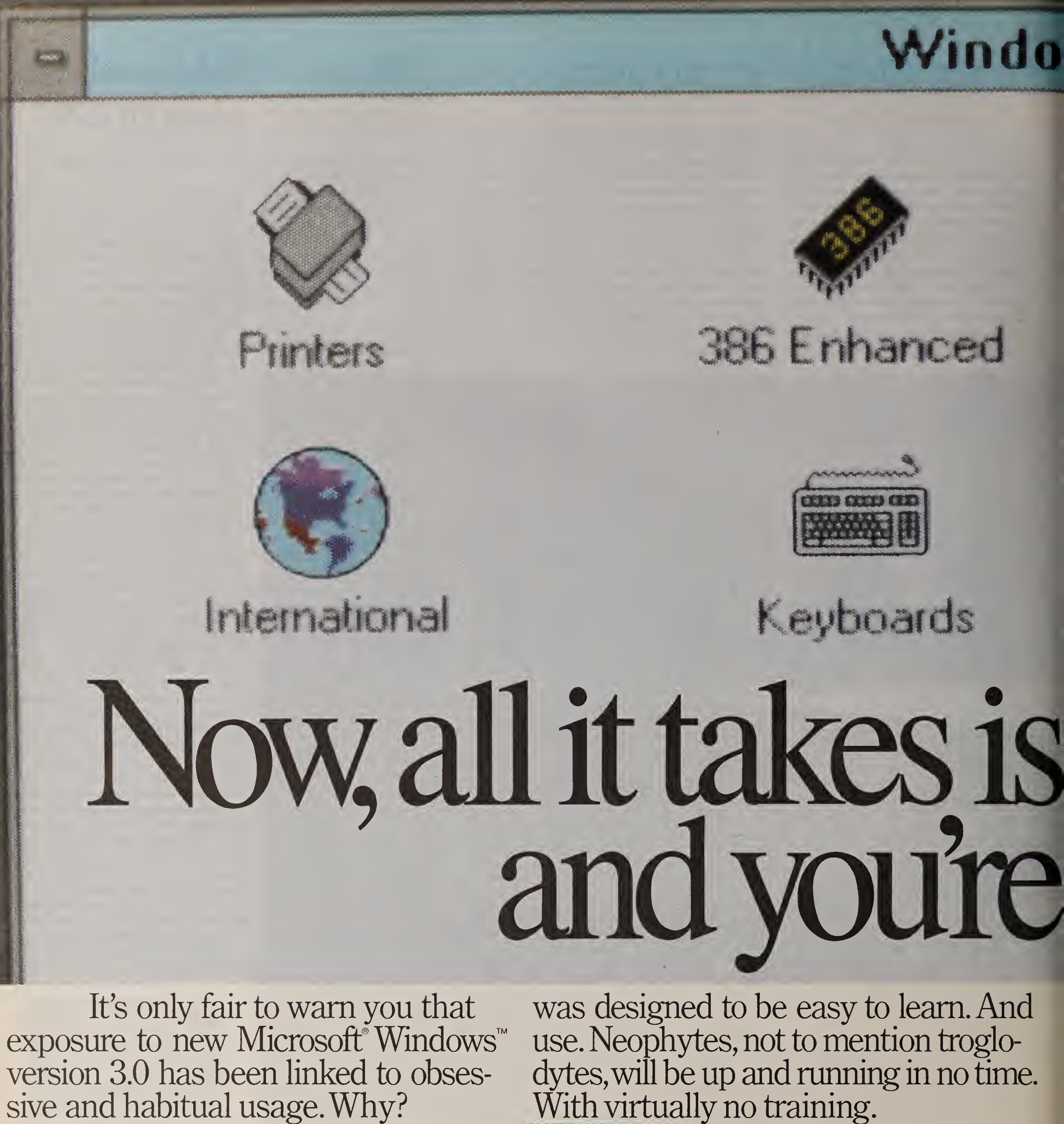

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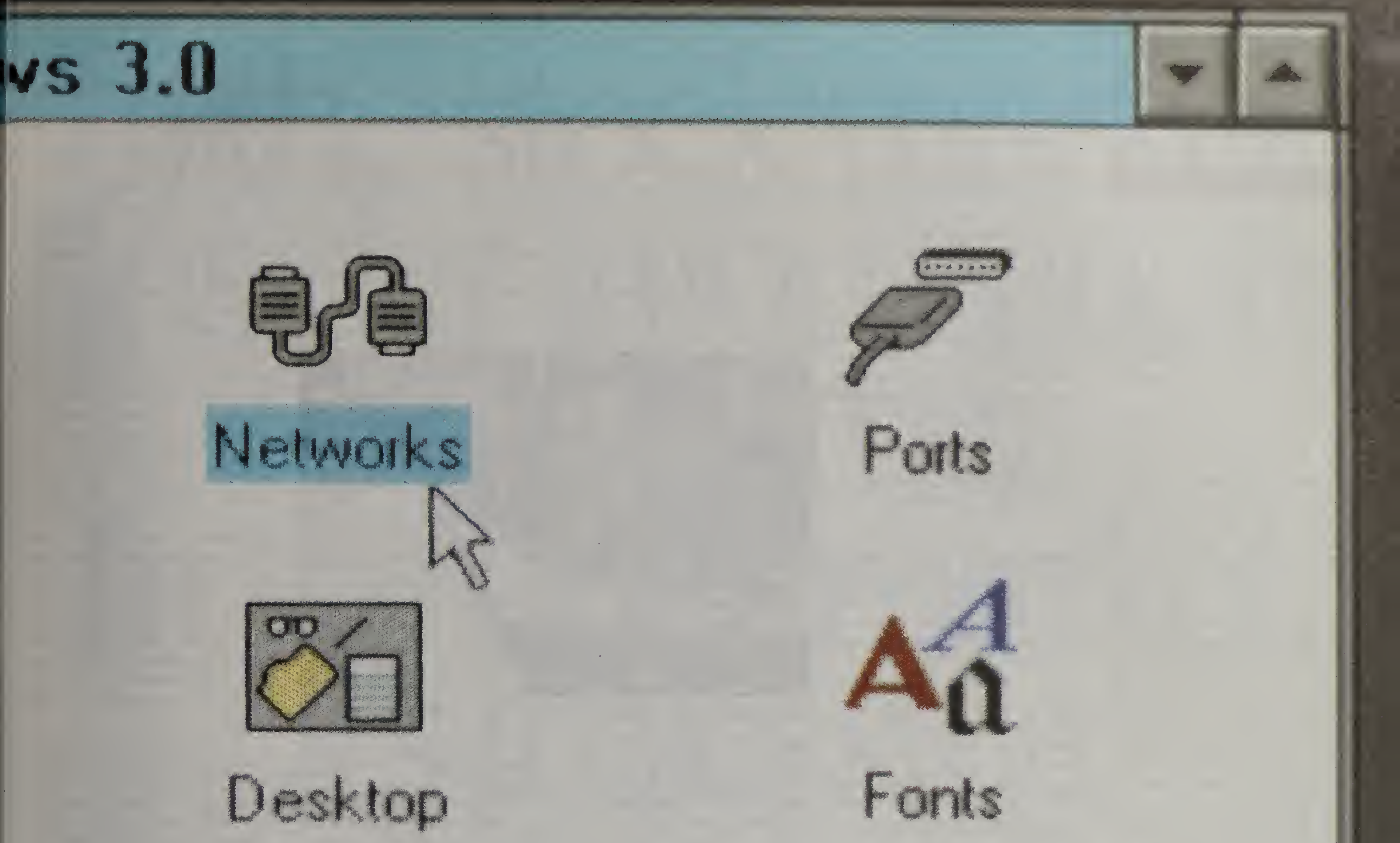

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Gordon Humphrey: An on-line senator

ON SITE

BY GARY H. ANTHES
CW STAFF

WASHINGTON, D.C. — Sen. Gordon J. Humphrey values silence so highly that he had his personal computer modified so it would not beep. "Now the noisiest thing in here is the ventilation system," he said.

"Here" is an oval, cocoonlike office tucked away in the dome of the U.S. Capitol. The New Hampshire Republican spends hours each day in "the hideaway," isolated from his staff and his official office a half mile away.

Isolated, but not cut off. The senator maintains a nonstop digital dialogue with his staff through his PC and a network of staffers' PCs tied into a Data General Corp. minicomputer. By all accounts, he is one of the most prolific users of electronic mail on Capitol Hill, and he said E-mail and other office automation tools have revolutionized the way he works.

"When I came to Washington in 1979, there were typewriters, dictaphones, paper, memos lying around. It was terrible. Now things are vastly more streamlined, orderly and efficient," he said in an interview with *Computerworld.*

Humphrey said that when he used to work in his office in the nearby Hart building, it would take him 15 minutes to get to the Senate floor for a vote. With four votes per day not uncommon, he spent hours each week just getting back and forth. Now, the electronic extension of his office puts him just 45 seconds from the Senate floor. "I couldn't do this without the computer," he said.

Aides only

Humphrey has no secretaries on his staff of 25; all are aides who do occasional clerical work using PCs or dumb terminals tied into the office's centralized minicomputer. "We only communicate with the senator in his hideaway," one staffer said. "[E-mail] is the only way to talk to him. He uses the phone very, very seldom." Another aide said she communicates with Humphrey regularly but sees him only every few weeks.

"I'm not antisocial. I like to go out and have a drink with the staff," Humphrey said. "But I don't like a lot of commotion. I like order. There's not much order in the legislature, but this helps."

Humphrey is a former commercial airline pilot, and his penchant for order and efficiency seems a heritage from those disciplined days. He acknowledged that the more traditional, back-thumping politicians are less likely to embrace technology. "Lots of [congressional] offices are automated, but very few senators use computers themselves," he said.

Humphrey does *Senate business from PC-laden hideaway*

Humphrey has a similarly equipped hideaway in his house in Chichester, N.H. When the Senate is not in session, he reaches out to Washington electronically through a modem and telephone lines. "I'm at the computer all day," he said.

Humphrey even takes a laptop computer on vacations but has so far resisted the temptation to take it out to the beach.

Whether in Washington or elsewhere, the senator uses word processing to draft speeches and to edit bills and amendments sent to him electronically. Press secretary William Anthony also downloads important news stories from commercial wire services and ships them to Humphrey's PC.

"We're by far the most responsive office on Capitol Hill, all because of the computer," Anthony claimed. "Reporters on deadline needing a quote from a conservative Republican can get the senator on-line in seconds." When a major news story is breaking, Anthony queues up reporters' calls and puts them through in turn as Humphrey keys "now" into the system.

Perhaps intentionally, the Humphrey hideaway has the feel of a cockpit, with the small workspace surrounded by PCs, a printer, radio, television and other high-tech gear. Humphrey even wears a telephone headset. "I'm a techno-freak. I like machines and electronics," he explained.

Except, however, when they do not work. "It's a crisis when the CPU goes down," Humphrey said. "Things come to a screeching halt, and it takes a couple of hours to figure out how to do things the old way."

NEW PRODUCTS

Systems

Swan Technologies has announced the 486/25, an Intel Corp. I486-based system that can be configured with small computer systems interface (SCSI) hard drives as large as 600M bytes to meet customers' needs.

Features include 4M bytes of 32-bit, 80-nsec random-access memory, which can be expanded to 16M bytes; an 8K-byte internal cache and 64K-byte secondary cache; and 1.2M-byte, 5¼-in. or 1.44M-byte, 3½-in. floppy disk drives.

A fully configured unit with a 16-bit IBM Video Graphics Array (VGA) video card, a 180M-byte SCSI hard drive and a VGA color monitor costs $6,599, according to the firm.

Swan
3075 Research Drive
State College, Pa. 16801
814-238-1820

Imagine, Inc. has begun shipping its multimedia software package for Next, Inc.'s Next computer.

Mediastation combines the following features on multimedia archives: database features, high-resolution image scanning and processing, compact disc-quality sound recording and editing, frame-by-frame animation and text processing. The archives can be stored on an optical disc and were designed for interactive multimedia training, digital image and sound libraries, interactive documentation or desktop presentations.

The product is being distributed commercially by Businessland, Inc. for $2,500.

Imagine
32 N. Washington
Ypsilanti, Mich. 48197
313-487-7117

Software applications packages

Great American Software, Inc. has announced Financial Manager, a small-business accounting and financial software package.

The product, which is being marketed by Great American and Lotus Development Corp. under terms of a joint agreement, includes One-Write Plus Accounting System Version 2.06 and Lotus' 1-2-3 Release 2.2. These two programs are linked by Great American's @Accounting software bridge.

Financial Manager requires an IBM Personal Computer AT, XT, Personal System/2 or compatible with 640K bytes of random-access memory, a hard disk and DOS Version 2.1 or higher. It costs $795.

Great American Software
615 Amherst St.
Nashua, N.H. 03063
603-889-5400

Software Publishing Corp. has announced an enhanced version of its managerial word processing software package.

Professional Write 2.2 includes an integrated version of Reference Software International's Grammatik IV grammar checker, which checks documents for errors in grammar, style, punctuation and usage.

The software runs on an IBM Personal Computer AT, XT, Personal System/2 or compatible and requires 512K bytes of random-access memory and DOS 2.0 or higher. It sells for $249.

SPC
P. O. Box 7210
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94039
415-335-2080

Lotus Development Corp. has begun shipping Freelance Maps 3.0, a collection of U.S. and international map symbols designed to work with Lotus Freelance Plus Release 3.0 and higher.

The software includes maps of U.S. highways, telephone area codes, time zones, A.C. Nielsen Co. Designated Market Areas, Arbitron Areas of Dominant Influence and Canadian provinces, cities and highways. It is available through Lotus-authorized resellers for $395.

Lotus
55 Cambridge Pkwy.
Cambridge, Mass. 02142
617-577-8500

Software utilities

An IBM AIX backup utility designed for use with IBM's RT workstations and Personal System/2s has been announced by Cambex Corp.

Centri-Stream is available on all RT 6150s and 6151s and all PS/2 Model 70s and 80s running the AIX operating system, IBM's variant of Unix.

Among features included in Centri-Stream are backup and restore functions at the image, directory or file levels; full or incremental backups; multitape backups and multiple backups per tape; matching of wild cards; comprehensive media management; and status messages with an on-line Help function.

The product operates on IBM 6157-compatible devices and is scheduled to be available for AIX 3.0 this summer. A single-machine license costs $299, according to the company.

Cambex
360 Second Ave.
Waltham, Mass. 02154
617-890-6000

Insignia Solutions, Inc. has announced a software module that provides users of Apple Computer, Inc. Macintosh systems with IBM Personal Computer AT compatibility and color.

The Softpc AT module features IBM Enhanced Graphics Adapter support and provides Macintosh users with simultaneous bidirectional copy and paste functions between DOS and Macintosh systems.

The product includes Insignia's Softpc 1.3 software, which runs on a Mac II or SE/30 and requires 2M bytes of random-access memory.

The suggested retail price for the module is $199.

Insignia
254 San Geronimo Way
Sunnyvale, Calif. 94086
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Board-level devices

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The product features 64K bytes of dual-ported random-access memory and is offered with either RJ-45 or RS-232C connectors. The price is $1,995 or $2,295, depending on the interface used, according to the company.

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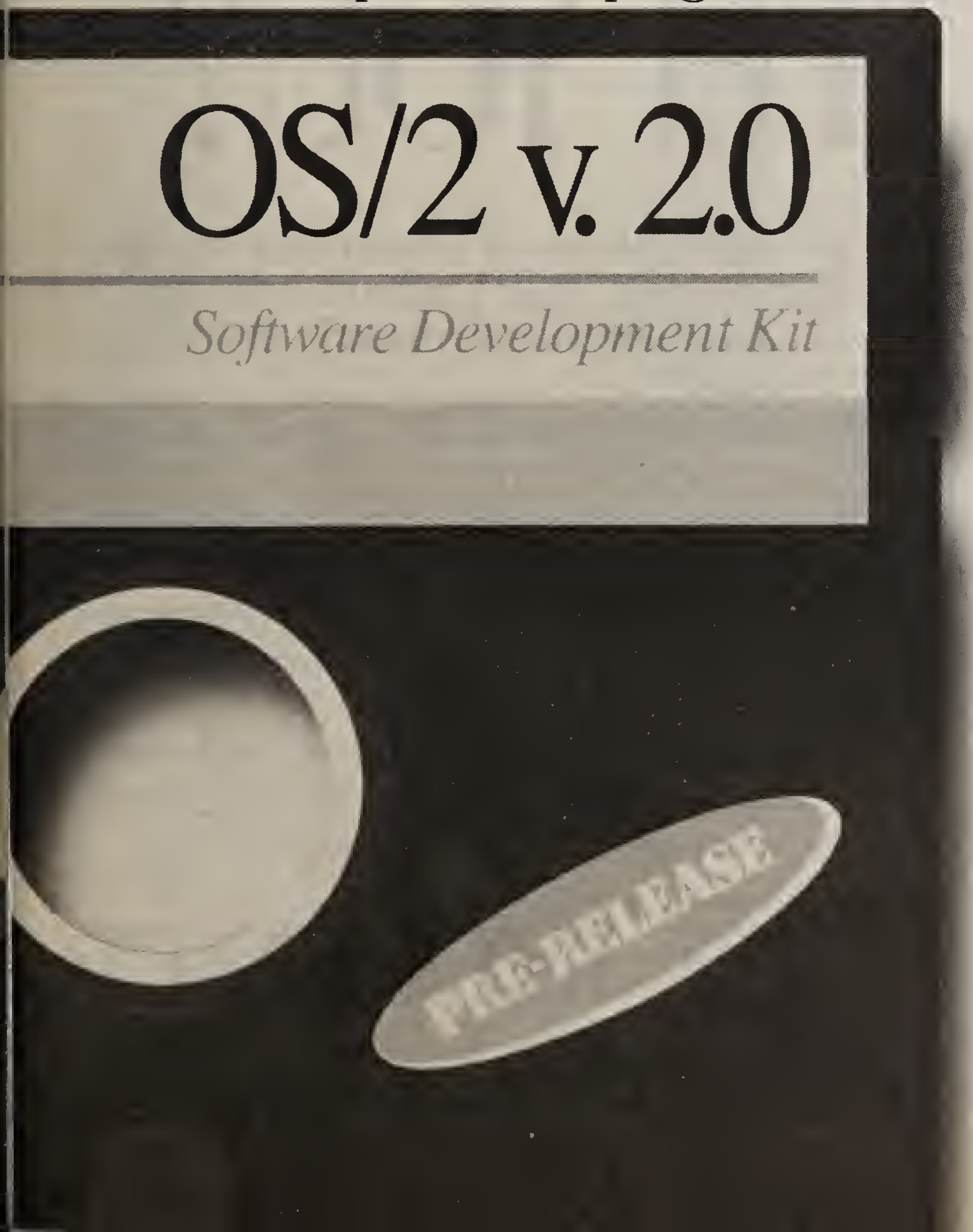

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DATA STREAM

Joanie M. Wexler

From duck sauce to DCE

There's something about the Open Software Foundation's (OSF) Distributed Computing Environment (DCE) that reminds me of those combination-plate lunch specials you get in a Chinese restaurant.

Admit it — doesn't your heart sink slightly when you find that the otherwise perfect *moo goo gai pan/pork-fried rice/hot and sour* soup combo comes with chicken fingers when you really want the egg roll?

But — like OSF's DCE — there are no substitutions without a slight wait and a surcharge. So you probably decide to settle for getting most of what you want because, after all, combination plates basically hit the spot and are pretty cheap.

OSF's integrated DCE package is a decent solution, too, but it won't totally satisfy everyone hungering for standards and open systems. There are going to be folks making compromises, such as those already using Sun Microsystems' remote procedure call (RPC) technology for distributed application processing (about 800,000 of you), which was jilted for Hewlett-Packard's and DEC's Sun-incompatible RPC.

OSF's DCE, however, is reportedly "modular," allowing users to do a certain amount of software-swapping in favor of the technologies they prefer. The OSF will deliver a standard package of source code to vendors that, in turn, can tweak the package for their customers, or the customers can do it themselves. Of course, the more tweaking, the greater the potential for installation delays and cost hikes.

One point of concern is that the folks who selected these technologies might not have a tight enough grip on what they are integrating. For example, Sun has been whining that its ubiquitous Network File System for tracking files between hosts is not inherently compatible with Transarc Corp.'s AFS, the OSF-sanctioned host-based file tracking system.

Continued on page 55

Multimegabit switched service on trial

BY ELLIS BOOKER
CW STAFF

While users impatiently await the promised "ubiquitous" deployment of the Integrated Services Digital Network (ISDN), local-exchange telephone companies are moving toward the next phase of this all-digital network architecture: broadband ISDN.

Regional Bell holding companies are now preparing trials of a precursor to broadband ISDN called switched multimegabit data service (SMDS), which can deliver imaging and multimedia applications over public, fiber-optic-based packet networks at speeds of up to 45M bit/sec., eventually reaching the broadband ISDN rate of 150M bit/sec.

A high-level protocol riding on IEEE's metropolitan-area network (MAN) 802.6 standard, SMDS will allow users to extend their local networks over entire cities. Speeds for SMDS networks in the 600M bit/sec. to 1.2G bit/sec. range are technically feasible and could be used to interconnect premises-based fiber-optic networks.

"It will match to the high-level application layers of LANs, whereas T1 networks will not offer this [interconnection] unless running ISDN," explained Dataquest, Inc. senior industry analyst Steve Sazegari. Sazegari said he sees the telephone companies struggling to keep pace with the need for high-bandwidth services and compete with premises-based local-area network technologies.

However, David Passmore, a partner at Ernst & Young, noted that while broadband ISDN and SMDS both use fast-packet technology, they have incompatible framing approaches, making migration from one to the other difficult. Passmore said his other reservation about SMDS is that few vendors have adopted it. Many equipment vendors have already committed to supporting the 100M-bit/sec. Fiber Distributed Data Interface (FDDI) standard for local and campus networks, he added.

Even so, with broadband ISDN another four or five years away and with some phone companies predicting that tariffed SMDS services will appear within the next year or two, the tech-

Continued on page 55

Your number's up

IEEE Standard 802.6 is the developing specification for metropolitan area networks. It describes a fast-packet, dual-bus, 30-mile fiber ring and a speed of 45M bit/sec. Eventual speeds up to 600M bit/sec. are expected. Switched multimegabit data service is the first service description for the 802.6 standard.

The CCITT standard for narrowband ISDN defines two types: A basic-rate interface with two 64K bit/sec.transmission channels, and a primary-rate interface with 23 64K bit/sec. transmission channels. Broadband ISDN, which uses fast-packet technology, will be in the 150M bit/sec. speed range.

FDDI is the ANSI standard for a fiber-optic ring with 100M bit/sec. transmission speed. Although FDDI was originally conceived of as a method for interconnecting LANs in a campus environment, some observers say it will replace all LAN topologies.

Users vote for on-line monitoring of telecom

BY ELISABETH HORWITT
CW STAFF

ATLANTA — Business customers want to reach out and touch their telephone companies' information systems with their terminals in order to improve their carriers' responsiveness in such critical areas as billing, problem resolution, service provisioning and planning.

Many are also willing to pay for the privilege, according to a recent survey by Andersen Consulting's telecommunications industry group.

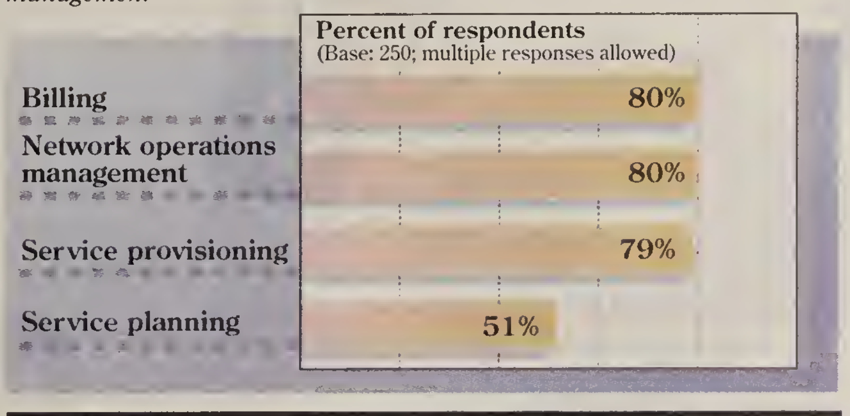
Driving this demand is an increasing need for improved carrier service, said Harold Botts Jr., senior partner in telecommunications at Andersen Consulting's Strategic Services practice. This is particularly true for the 250 users surveyed recently by the firm, whose companies are in the financial services, hospitality/travel and retail/wholesale sectors, which rely heavily on telecommunications, he added.

For example, respondents gave improvement of carrier billing practices "a 9 in importance on a scale of 10," Botts said. Many users had experienced such problems as "charges they thought were reconciled reappearing," he said. Users expected that on-line access to carrier systems "must of necessity make the telcos more accurate, particularly in billing, as well as enable them to reconcile disputes more quickly," he added.

On-line operations management was another application area given priority by users.

At their fingertips

Users most want on-line access to their carriers' billing systems and network management



Source: Andersen Consulting

CW Chart: John York

"Users don't want to monitor all the trouble on the network — they figure that's the job of the telco," Botts said. "But when they feel there is a problem, they do want to check the status of telcos' troubleshooting efforts." In particular, those users who "have mission-critical systems, such as on-line credit or reservations systems, want to understand that sufficient effort and thrust is being put on solving their problems," he added.

Service provisioning was another hot button for users, who want to be able to enter orders for new lines directly into the system rather than by voice or mail, Botts said. Respondents for whom the typical two-week line provisioning schedule is unacceptable said they hoped that on-line provisioning would not only shorten that period but also allow them to "escalate a request's priority" with the carrier, he added. Users also expressed interest in being able to check the status of a provisioning order on-line, Botts said.

A smaller segment of respondents — 50% — expressed interest in on-line access to the carriers' tariff databases and network design tools, which could be used to do network planning. A likely reason this application was assigned a lower priority is because network design is not a "day-to-day activity" critical to a firm's daily operations, Botts said.

Both local and long-distance carriers are beginning to roll out products to answer users' on-line access needs. However, it will take in the neighborhood of $100 billion and 10 to 15 years for carriers to fully meet users' on-line service needs, according to William Burgess, worldwide managing partner for Anderson's telecom industry group.

One piece of this effort involves "upgrading current underlying systems that support basic transactions such as trouble reporting and provisioning," Burgess said. The other is integrating such systems, which now run over disparate databases, hardware platforms and internal networks, so that users can manage their networks from a single terminal, he said.

On the other hand, users expressed a preference for human rather than electronic interaction when it came to resolving complex networking problems, Botts said: "If you are really changing how the network is configured, you want to sit down with people who understand business and technical problems and discuss what the new configuration will be." Likewise, when "significant billing problems" extend back as long as 10 years, as some survey respondents reported, most users "want to sit down with a human being and work it out," he added.

October 28, 1981
Patched radial tire
MasterCare® Center
New York, New York

February 12, 1981
Tune-up, replaced air
hose and shocks
MasterCare® Center
Philadelphia, Pennsylvania

May 25, 1986
Tune-up,
new brake shoes
MasterCare® Center
Chicago, Illinois

May 2, 1979
A full tune-up,
new belts
MasterCare® Center
Hackensack, New Jersey

June 2, 1989
New fuses, new plugs
MasterCare® Center
Washington, D.C.

December 14, 1987
Replaced brake light
MasterCare® Center
Chicago, Illinois

March 15, 1990
Tire rotation
MasterCare® Center
New York, New York

November 27, 1989
Tune-up, lube job
MasterCare® Center
Chicago, Illinois

July 1, 1984
Tune-up, lube job
MasterCare® Center
Chicago, Illinois

January 18, 1982
Replaced muffler
MasterCare® Center
New York, New York

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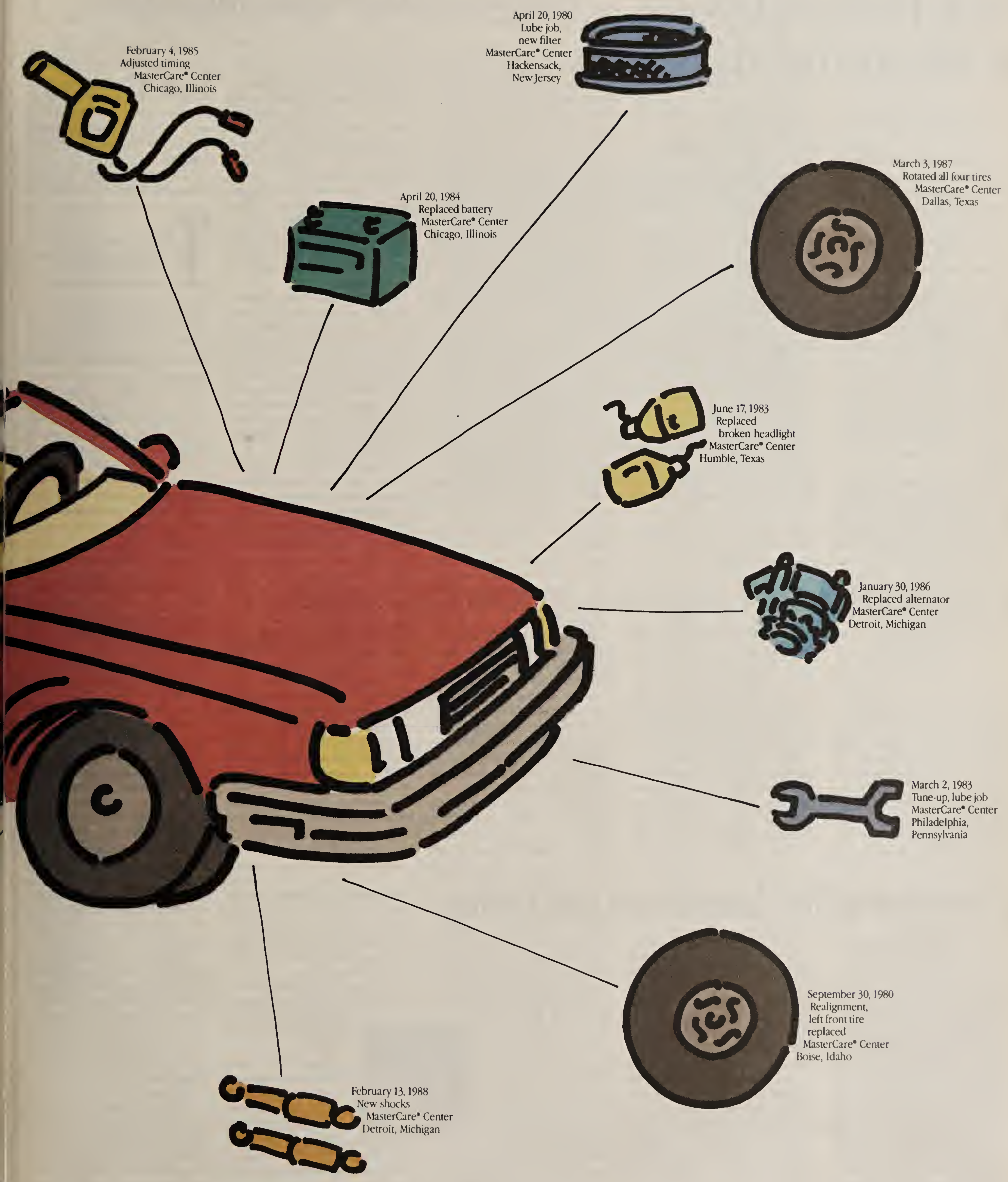

April 20, 1980
Lube job,
new filter
MasterCare® Center
Hackensack,
New Jersey

February 4, 1985
Adjusted timing
MasterCare® Center
Chicago, Illinois

March 3, 1987
Rotated all four tires
MasterCare® Center
Dallas, Texas

April 20, 1984
Replaced battery
MasterCare® Center
Chicago, Illinois

June 17, 1983
Replaced
broken headlight
MasterCare® Center
Humble, Texas

January 30, 1986
Replaced alternator
MasterCare® Center
Detroit, Michigan

March 2, 1983
Tune-up, lube job
MasterCare® Center
Philadelphia,
Pennsylvania

September 30, 1980
Realignment,
left front tire
replaced
MasterCare® Center
Boise, Idaho

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ICA: Bells still living in the good ol' days

BY ELLIS BOOKER
CW STAFF

NEW ORLEANS — Bell operating companies have failed to shed their monopolistic ways of doing business and are not offering the services or prices users want, the International Communications Association, a 700-member user group, charged recently.

A report prepared for the ICA's telecommunications public policy committee by Economics and Technology, Inc., a Boston-based consultancy, claimed that the BOCs continue to approach network services planning and pricing as "business as usual" and are still resisting the notion of unbundling the functions of their monopoly networks.

The report stated that the basic business agendas of the BOCs have not changed since before the breakup of the Bell System in 1984: They wish to exploit their control of the network and its capabilities so they can enter and dominate new markets such as information services. For these reasons, local-exchange carriers should not be given the regulatory relief they seek, the ICA paper said.

As a case in point, the report pointed to the slow acceptance of the BOCs' Integrated Services Digital Network (ISDN) offerings.

"User dissatisfactions with ISDN," the report said, "are not indicative of problems with the technology per se but symptoms of the BOCs' insistence on controlling that technology and limiting customer access."

Like Touch-Tone before it, ISDN is being incorrectly marketed by companies such as Pacific Bell as "prepackaged offerings that are once again subject to 'premium service' pricing," according to the paper, which suggested that the BOCs have taken this approach — slowing the deployment of ISDN — in order to protect revenues derived from older network services.

The paper recommended that the local-exchange infrastructure should follow the model of the computer industry, with the BOCs assuming the role of providers of a "basic applications platform" that outside developers can use to create specific services and products for end users.

Unbundling the capabilities of the local-exchange network is the goal of Open Network Architecture (ONA), a plan put forth by the Federal Communications Commission.

However, ONA implementation by the local carriers has fallen far short of this ideal, the paper charged.

Although Pacific Bell had not seen a copy of the ICA white paper as of press time last week, a spokesman for the Pacific Telesis operating company said, "The fact is, the FCC has approved our ONA plans, and there is a great deal of uniformity currently in the plans today. We are willing to unbundle the network to meet marketplace needs, consistent with our commitment to meet universal service requirements."

ISDN goes interstate

First-time demo connects regional networks

NEW ORLEANS — The nation's first interstate Integrated Services Digital Network connection between different regional telephone networks was demonstrated recently by Ameritech- and Bellsouth-owned local operating companies.

The companies established a videoconference between a Mellon Bank regional office in Chicago and the Ameritech booth at the International Communications Association exposition in New Orleans.

MCI Communications Corp.'s switched digital services network provided the long-distance leg of the demonstration, which expanded on the ongoing ISDN videoconferencing pilot at the Mellon Bank. The bank successfully tested an ISDN-based video link earlier this year between its Pittsburgh corporate headquarters and Philadelphia.

Picturetel Corp. in Peabody, Mass., provided the coder/decoder digital compression unit for the demonstration, while Fujitsu ISDN Systems Division, the San Jose, Calif.-based arm of Fujitsu Network Switching of America, Inc., supplied the ISDN terminal adapters used to interface with the local ISDN services of Bellsouth's South Central Bell and Ameritech's Illinois Bell.

Illinois Bell was the first telephone company in the nation to tariff an ISDN service. South Central Bell, which has tested the technology but does not plan to file its ISDN tariffs until early next year, said last week it expects volume deployment of the ISDN Basic Rate Interface in its major metropolitan areas beginning in 1991.

THE companies established a videoconference between a Chicago bank office and the Ameritech booth at the ICA exposition in New Orleans.

U.S. Sprint, AT&T play keep up with the Joneses

BY ELLIS BOOKER
CW STAFF

NEW ORLEANS — The recent International Communications Association show saw some one-upmanship going on in the high-speed switched services arena between two long-distance carriers. U.S. Sprint Communications Co. revealed plans at the show to make switched 64K bit/sec. services available later this year, while AT&T announced a similar service as part of its new Software Defined Data Network introduction.

However, Sprint officials said they were not prepared to discuss a timetable for announcing a switched 384K bit/sec. service to compete with AT&T's 384K bit/sec. introduction at ICA.

Also at ICA, Sprint introduced a service that allows users to access both its Sprintnet packet-switched network service and circuit-switched long-distance services over the same T1 line.

With the access service, users will be able to dial into Sprintnet nodes and reach a host or local-area network by keying in its network address. In addition, data calls from Sprint's circuit-switched long-distance network can be routed through the interconnection to reach host computers or personal computers attached to Sprintnet.

Sprint also said it is expanding the access alternatives for its 56K bit/sec. circuit-switched service, which currently requires a dedicated T1 line from Sprint or the local phone company. Customers can now use Dial 1 Digital service lines provided by five of the seven regional Bell holding companies and major independent telephone companies, Sprint said.

Finally, Sprint announced an addition to its TP4000 family of packet switches. The TP4944 is the smallest version of the series, all of which support T1 and fractional T1 circuits, as well as an Integrated Services Digital Network Primary Rate Interface and a frame relay interface, which will be available in the third quarter. The frame relay interface will work with the TP7900 series of fast-packet multiplexers manufactured for Sprint by Campbell, Calif.-based Stratacom, Inc.

Meanwhile, MCI Communications Corp. enhanced its digital private line service with a multipoint capability, added clear-channel 64K bit/sec. capacity to its digital private line and digital data services and will provide digital data access to its switched 56K bit/sec. service.

Uncle Sam's ISDN bandwagon gets rolling

BY ELISABETH HORWITT
CW STAFF

WASHINGTON, D.C. — Some 38,000 government users received the option of getting on the ISDN bandwagon late last month when the first cutover phase of the General Services Administration's Washington Inter-Agency Telecom Service (WITS) was officially completed.

However, while the GSA has determined that Integrated Services Digital Network (ISDN) is likely to make economic sense for at least some of the regional fiber-optic network's user agencies, it is bending over backward not to push the technology on its customers, according to GSA electronic engineer Charles William Stacey, who is working on the WITS project.

"Very definitely, our agencies are autonomous, and this is not something you want to mandate," Stacey said. "Our approach is to provide a vehicle and make sure it is thoroughly tested and then sit down [with users] and look at the cost vs. that of alternatives such as LANs."

Initially, all WITS lines will be analog and used primarily for voice communications, Stacey said. Because many agencies already have local data communications facilities such as local-area networks in place, "we don't expect a landslide [to ISDN] any more than there has been on the public network," Stacey said. "Government users are fairly conservative people, and they know LANs work."

The GSA thinks, however, that "users should look at [ISDN] if they are considering modification of their network in any way, or just moving from one floor to another," Stacey said.

One such user organization is the Small Business Administration (SBA), which plans to move into a new building in October and go on-line with WITS at the same time, according to the agency's system administrator, Joseph Maas. The SBA has hired a consultant to evaluate ISDN voice/data networking that would complement, but not replace, the LANs it plans to install in its new premises, Maas said.

One ISDN application that the agency is particularly interested in is the integration of voice mail and electronic mail, so that, for example, "when I transmit a document to my directors, I can give them a voice message so they get the nuances of what I want," Maas said.

However, cost will be a major factor in the SBA's final decision, he added: "We know [ISDN] doesn't come cheap."

The GSA sees ISDN as a viable option for users whose data requirements can be fulfilled by the ISDN B channel's 64K bit/sec. rates rather than a 2M bit/sec. LAN, he added.

The WITS contract, which was awarded to Chesapeake & Potomac Telephone Cos. (C&P) in January 1989, involves moving 133,000 government agency users in the Washington area from existing Centrex lines — also provided by C&P — to a private fiber-optic metropolitan-area network over a three-year period.

Under the contract, C&P's unregulated subsidiary will provide equipment such as three AT&T 5ESS switches as well as systems integration services. The contract is valued at between $220 million and $282 million over its 10-year span, Stacey said.

Meanwhile, the GSA is still evaluating the hows and whens of providing long-distance ISDN on its Federal Telecommunications System (FTS) 2000 service, according to Michael Corrigan, assistant deputy commissioner of telecommunications services. "Our initial focus is on linking users' PBXs to FTS 2000 services via Primary Rate Interface," primarily to deliver caller number identification for billing purposes, Corrigan said.

U.S. aid takes electronic twist

Implementation of on-line food stamp program eases retailer, user woes

BY GARY H. ANTHES
CW STAFF

WASHINGTON, D.C. — The federal government is moving toward an electronic revolution in the way benefits are distributed to tens of millions of Americans. At the same time, the government hopes to foster the development of a commercial infrastructure that could grow into a multibillion dollar business.

The U.S. Food and Nutrition Service (FNS), a part of the Department of Agriculture, administers the program by which 2.5 billion food stamps worth $13 billion are issued to 20 million people, used in 225,000 food stores and processed by 10,000 banks each year. The process is unavoidably labor-intensive, error-prone and subject to abuse.

To find a better way, FNS is establishing programs for the electronic distribution of food stamps, a form of electronic benefits transfer, or EBT. Test programs are now in place in Reading, Pa. and Baltimore. New pilots are due this year in New Mexico, Minnesota and Iowa, and 11 more states have said they want to start programs. While many details and a few fundamental questions remain to be resolved, the agency has every intention of seeing paper food stamps disappear by the turn of the century.

In the Baltimore pilot, 4,000 households were issued plastic magnetic-strip cards. In the grocery line, the card is run through a point-of-sale terminal, a personal ID is entered and money is transferred from the customer's food stamp account to the grocer's account in a host computer at a regional site.

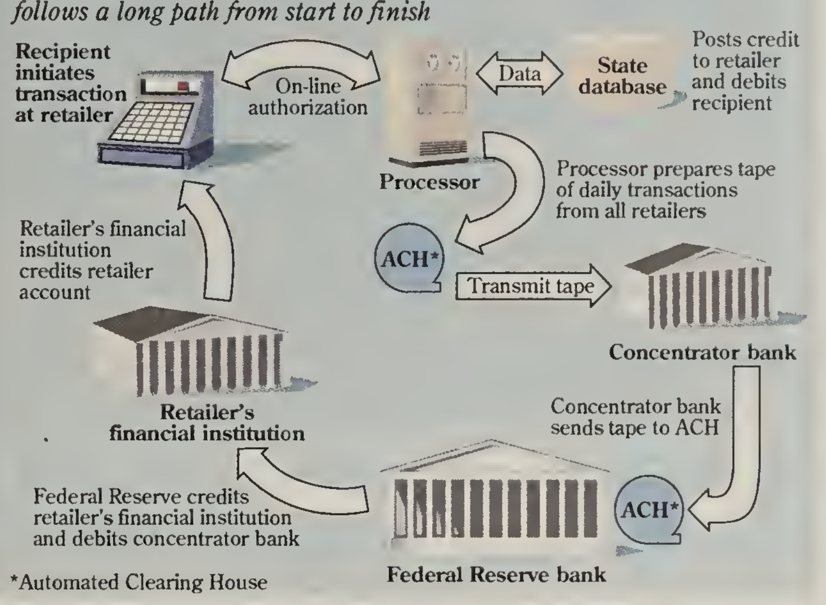
Food stamp data flows through the commercial MOST network of Internet, Inc. MOST serves 420 member financial institutions in six mid-Atlantic states, connects 4,000 automatic teller machine sites and has on-line connections to 65 mainframe computers at member and third-party data centers. The mainframes tie into two regional network nodes which in turn connect to a fault-tolerant Tandem Computers, Inc. switch.

The pilot projects have demonstrated technical feasibility, said Birge Watkins, deputy assistant secretary. The new approach is favored by retailers, food stamp shoppers, banks and state administrators, he said.

Watkins said a survey showed that 70% of retailers participating in the tests favored EBT because it gets rid of paper handling, reduces fraud, eliminates the need to give cash change and offers same-day redemption of stamps for cash. The survey showed that the cost to retailers was reduced 28%. Recipients like the program because their benefits are not subject to theft, and they can avoid the stigma of food-stamp use, he said.

Long and winding road

Each transaction in the electronic benefits program follows a long path from start to finish


Recipient initiates transaction at retailer
On-line authorization
Data
State database
Posts credit to retailer and debits recipient
Processor
Processor prepares tape of daily transactions from all retailers
ACH*
Transmit tape
Concentrator bank
Concentrator bank sends tape to ACH
ACH*
Federal Reserve bank
Federal Reserve credits retailer's financial institution and debits concentrator bank
Retailer's financial institution
Retailer's financial institution credits retailer account

*Automated Clearing House

Source: U.S. Food & Nutrition Service

CW Chart: Paul Mock

However, not all the news from the test programs has been favorable. While retailer costs dropped, government costs soared. In the Pennsylvania pilot, monthly administrative costs jumped from $3 to $27 per household before falling to $9 after four years. While everyone agreed that costs will continue to drop as economies of scale take hold, FNS officials said that a cost-effective approach probably requires some multiple delivery of benefits and piggy-backing onto commercial systems.

According to Joseph J. Leo, an official with responsibility for information technology at FNS, food stamp distribution could share resources with the systems distributing welfare or Medicaid payments. In the Baltimore project, food stamp benefits, aid to families with dependent children and child-support payments are all paid through a single system. Maryland plans to follow the pilot with statewide implementation next year.

Conceptually, EBT can be viewed as a straightforward implementation of direct deposit. But food stamp distribution is tricky. By law, the benefit must go for approved food items only, ruling out an automatic cash deposit. By law, food stamps are issued by the federal government to states, so FNS has no direct relationship with recipients.

Doable

A nationwide system for food stamps will require many complex relationships among FNS, other federal agencies, state governments, retailers, financial institutions, hardware and software vendors, systems integrators and providers of networking services. "It's very difficult, but it's doable," Leo said.

While all the pilot programs so far use on-line technology, FNS is about to try a different approach. The agency will undertake a test project in which 8,000 to 10,000 households use smart cards to buy food.

The recipient's running balance and other information will be maintained in a tiny chip embedded in the card. As the cards are used, credits to retailers will be stored in a local terminal and sent through a financial network for daily deposit.

Wexler

FROM PAGE 51

When challenged, an OSF representative scoffed, "Of course they're compatible — just go ask Transarc." Oops — Transarc basically corroborated Sun's story, admitting that different protocols are at the heart of the two file systems but explaining that a translator included in the DCE package should remedy the incompatibility.

Of course, as one user puts it, "anything can be rigged up to be compatible" if you work hard enough and pay for it; the point of DCE is integration.

We don't know yet whether DCE will be offered at lunch-special rates — pricing will be based on "market demand," according to OSF. But it's still bound to be a better deal than gathering up the technologies a la carte from different vendors, particularly since the exact technologies coming out of OSF will not be available from the original vendors. OSF will be adding value and integrating the software, thus sparing users from the development headaches and/or costs.

One underlying question to OSF's activities is whether a "standard" platform should be chosen based on superior technology or on the size of the installed base. I tend to vote for technology, since users have learned not to become too attached to anything in this industry for fear it will soon be usurped by some faster, better, friendlier breakthrough.

But the above user votes for the installed base logic, noting that he often passes up technically superior products because they haven't mastered the communications his applications require.

Many have argued that OSF's selections were political (all were submissions from OSF members, other than Microsoft's PC integration software). Many have snarled that the user perspective is underrepresented at OSF (though OSF reports 100 user organizations compared with 45 vendor companies as members). And many are hollering that OSF's efforts to nail down an industry-standard Unix operating system is more of the essence than DCE. What you can laud OSF for, however, is that it is addressing a concrete industry need by providing a convenient way for some users to achieve interoperability over multivendor distributed environments.

It has also fostered some degree of camaraderie among vendors, who make strange bedfellows in an industry moving to standards as they struggle to balance competition with cooperation. The resulting joint effort provides an integrated solution much sooner than if the vendors had developed along their own separate paths.

Users have much to be thankful for — as long as they're willing to give up the egg roll.

Wexler is a *Computerworld* senior writer.

On trial

FROM PAGE 51

nology could have an appeal to some users.

Trials have already been announced by two of the regional holding companies.

Bell of Pennsylvania, a Bell Atlantic company, will conduct a SMDS trial this summer at Temple University in Philadelphia. It will send medical and other kinds of image data through its fiber network, linking two of Temple's five campuses through a packet switch from QPSX Systems, Inc. The switch maker is a New Jersey-based subsidiary of MAN pioneer QPSX Communications Party Ltd.

Bell Atlantic officials said that if the test goes as planned, the SMDS service could be provided to other customers in Philadelphia and other cities in Bell Atlantic's territory by next year, with full commercial service available by the winter of 1991.

Another university SMDS trial that will focus on the transmission of medical images was announced last month by Pacific Bell and Stanford University.

Applications in the Stanford trial, which will commence in August and run for at least a year, will include the transmission of X-ray, computerized tomography, magnetic resonance and ultrasound images. Stanford plans to transport high-resolution graphics of Earth's surface transmitted from satellites. An AT&T fast-packet switch will be used for the trial.

FDDI for them

Bill Yundt, director of Stanford's networking and communication systems, said the university is currently migrating its backbone network to FDDI and is therefore not planning to use SMDS as a backbone facility between several sites.

"I would not choose SMDS [for the backbone] because we don't need telephone-company compatible switching, and we don't have to put voice over this facility," he said. The SMDS at Stanford will be used exclusively for data.

The hope, Yundt said, "is that when the switching speeds of SMDS reach the 100M bit/sec. or above range, it will be reasonable for interconnecting FDDI networks."

Yundt is also the director of the Bay Regional Research Network (Barrnet), based at Stanford. Barrnet is a National Science Foundation-funded Internet hub for Northern California and will participate in the trial.

Another objective of the SMDS trial, Yundt said, is to evaluate a higher speed method for accessing Internet. Currently, this access is dominated by Transmission Control Protocol/Internet Protocol networking over dedicated T1 circuits.

However, Yundt and analysts said the appeal of SMDS and, for that matter, broadband ISDN will rest on cost as well as technical considerations. Telephone companies, however, have not discussed pricing structures for SMDS or broadband ISDN.

Last month, Nynex became the first regional company to conduct a live SDMS demonstration. The test, at Eastern Communications Forum '90 in Boston, used a 400-mile fiber-optic cable from New York to White Plains, N.Y. and Boston and passed a variety of images through a prototype switch.

HOW NAPOLEON WON THE BATTLE OF WATERLOO.

ON FEBRUARY 26, 1815, NAPOLEON BONAPARTE SET SAIL from his exile on the island of Elba. His mission was to return constitutional rule to an oppressed France, an idea that other European monarchs had vowed to fight to the death.

After landing at Antibes on March 1st, he set about preparing for war. A war that would culminate near the tiny Belgian village of Waterloo.

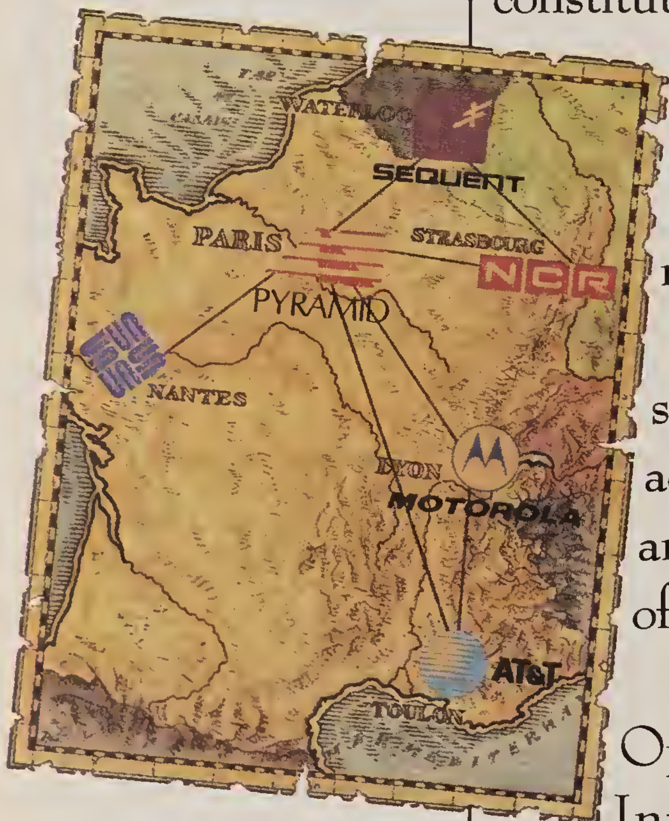
Napoleon knew that, to prevail, he would need to strike first. And he knew that such a tactic would require access to precise information. But, with limited resources and little time, a mainframe computer system was out of the question.

Then an aide alerted him to the ideal alternative. Open Systems information processing software from Informix. At the heart of the solution would be INFORMIX®-OnLine, the first mainframe replacement database management system.

◆ ◆ ◆ ◆

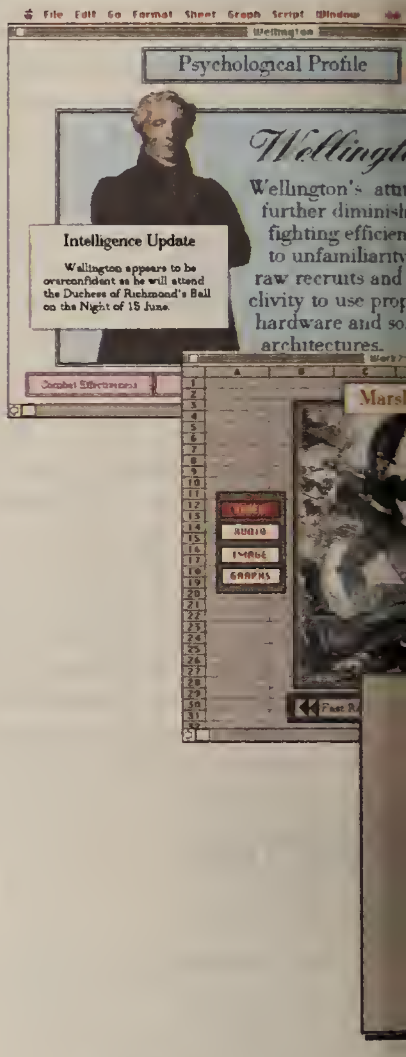
ONLINE'S DISTRIBUTED COMPUTING POWER MEANT Napoleon could process tens of thousands of transactions every minute, at outposts throughout the area of engagement.

But he soon learned that OnLine could do something no mainframe could. Its multimedia feature could store data in virtually any form. Including reconnaissance photos. Three dimensional maps. Multi-colored charts. Even clandestine sound recordings collected by his intelligence network.



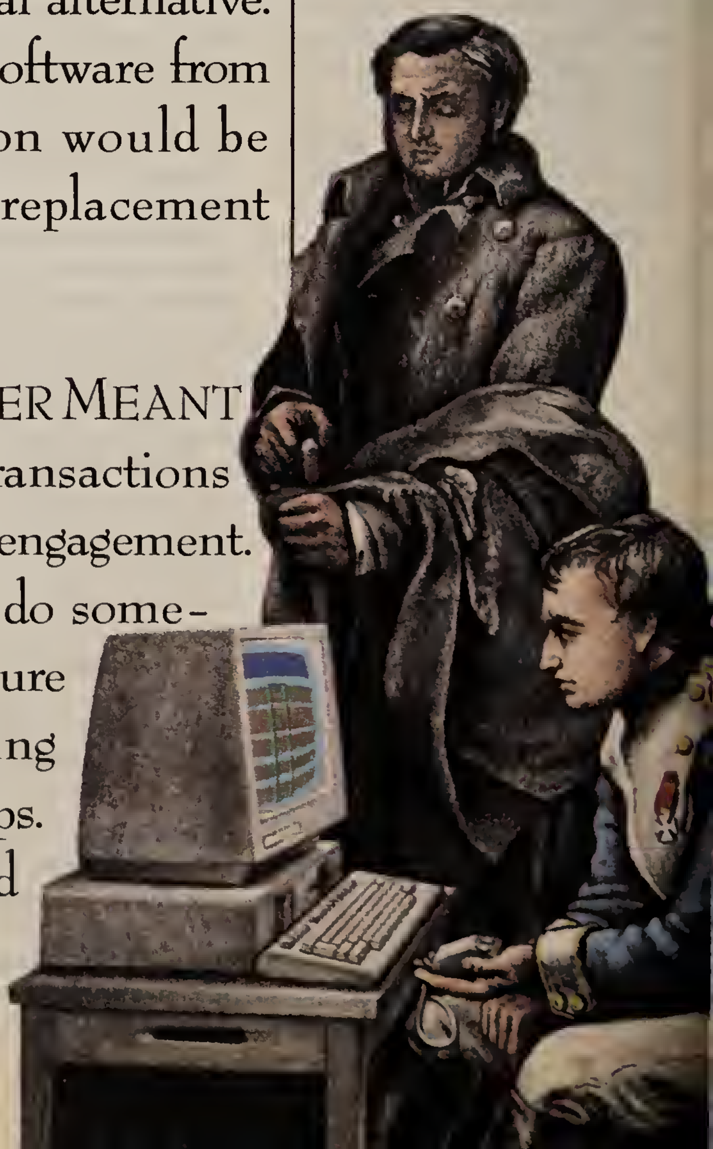
EARLY MAPS INDICATE THAT THE FRENCH HELD A TREMENDOUS EDGE OVER THEIR ENEMIES. THE PERFORMANCE AND RELIABILITY OF INFORMIX®-ONLINE MAINFRAME REPLACEMENT SOFTWARE. AND WITH INFORMIX DATABASE SOFTWARE RUNNING ON VIRTUALLY EVERY UNIX SYSTEM, NAPOLEON WAS ABLE TO CHOOSE THE MOST COST-EFFECTIVE HARDWARE FOR EVERY LOCATION AND APPLICATION.

NAPOLEON'S STAFF COMBINED THE WINGZ HYPERSCRIPT® PROGRAMMING LANGUAGE WITH DATALINK TO CREATE A CUSTOMIZED EXECUTIVE INFORMATION SYSTEM THAT LET HIM EASILY RETRIEVE SQL DATA BY CLICKING ON-SCREEN BUTTONS.



Intelligence Update

Wellington appears to be overconfident as he will attend the Duchess of Richmond's Ball on the Night of 15 June.



USING WINGZ DATALINK WITH ONLINE'S MULTIMEDIA CAPABILITY TO RUN A BATTLE SIMULATION, NAPOLEON DETERMINED PRECISELY WHEN HIS ELITE OLD GUARD WOULD HAVE THE MOST DEVASTATING EFFECT.

USING EITHER WINGZ ON GRAPHICAL PC'S, OR SMARTWARE ON DOS MACHINES, NAPOLEON'S STAFF COULD EASILY ANALYZE DATA AND PRODUCE REPORTS THAT COMBINED TEXT, GRAPHS AND DATA, ALL ON ONE PAGE.

HISTORIANS SUGGEST THAT NAPOLEON HIMSELF KNEW LITTLE OF COMPUTERS. BUT WITH WINGZ DATALINK, THE INFORMIX-ONLINE DATABASE BECAME AS EASY TO USE AS A SPREADSHEET.

Within three months, the French Commander had amassed an army of 120,000 men, supported by 246 pieces of artillery. The opposition would be a far greater allied force led by the Duke of Wellington.

But, while Wellington's staff struggled with traditional database systems that required experts and hours of work to generate reports, Napoleon's cadre had instant access to information through Wingz™ DataLink and INFORMIX-OnLine.

Historians acknowledge that this Executive Information System was perhaps the most formidable weapon in the French arsenal.

◆ ◆ ◆ ◆

ON THE EVENING OF JUNE 16th, NAPOLEON led his army across the Sambre River into Belgium, established headquarters at Beaumont and began his analysis.

As early reports came in, his strategic responses were transmitted to the field.

◆ ◆ ◆ ◆

AT ELEVEN O'CLOCK ON THE MORNING OF the 18th, Napoleon rose from a brief nap and gave the order for his guns to blaze.

Less than two hours into the fighting, more than 300,000 men were engaged in hand-to-hand combat.

The key moment came just before dusk. Napoleon used Wingz DataLink and OnLine to run a simulation projecting Wellington's casualty rate and delivered the coup de grâce.

The order went out to let loose five batallions of his elite Old Guard. Charging into the fray, they crushed what remained of the enemy's resolve.

Looking out over the victorious ranks, Napoleon raised a glass of his most precious cognac and uttered the now-famous words, "What a glorious day for France."

THE LOYALTY OF NAPOLEON'S STAFF DID NOT EXTEND TO THEIR CHOICE OF HARDWARE. COMMANDERS SELECTED WORKSTATIONS FROM SUN, IBM, APPLE, HEWLETT-PACKARD, DATA GENERAL, DEC AND NEXT. FORTUNATELY WINGZ AND DATALINK SUPPORTED ALL MAJOR GRAPHICAL USER INTERFACES, FROM MACINTOSH, PRESENTATION MANAGER AND WINDOWS TO MOTIF, OPEN LOOK AND NEXTSTEP.

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INFORMIX

NEW PRODUCTS

Local-area networking hardware

Tops Corp. has begun shipping a network interface card designed for IBM Personal System/2s and compatibles.

Flashcard MC was designed to enable IBM Micro Channel Architecture (MCA)-based computers to seamlessly communicate with computers on Apple Computer, Inc. Appletalk-based networks. The card can be installed in an MCA-based personal computer in less than 15 minutes, and it uses proprietary protocols to communicate over Appletalk-based networks at 770K bit/sec., the vendor said.

The suggested list price is $329.

Tops
950 Marina Village Pkwy.
Alameda, Calif. 94501
800-445-8677

Crosscom Corp. has announced a universal token-ring/IEEE 802.5 bridge that supports IBM Source Routing and Spanning Tree protocols.

The HSB-RR operates at 4M bit/sec. in local-area network environments and provides protocol-transparent bridging of 16M bit/sec. token-ring LANs, the vendor said. It also operates in four modes: IBM Source Routing, Spanning Tree, Source Routing Transparent and Dynamic Conversion.

The product is slated to be available next month for $7,950.

Crosscom
P.O. Box 699
Marlboro, Mass. 01752
508-481-4060

Network management

Foundationware, Inc. has announced an upgrade of Certus, its personal computer and local-area network management security software package.

Certus 2.0 was designed to control access to PCs and DOS-based LANs, monitor usage and provide system security and disaster recovery services. It includes a boot-lock capability that locks out attempts to boot from any drive other than drive C and features Certus VS, a computer virus scanning module that checks for known viruses in a system's random-access memory or on a disk.

Certus 2.0 is slated to ship this month for $189.

Foundationware
13110 Shaker Sq.
Cleveland, Ohio 44120
216-752-8181

AT&T Computer Systems has announced the release of its Stargroup Software Computer Manager and Computer Manager Agent.

Computer Manager Agent, an application that runs on an AT&T Unix System V computer, generates and forwards alarms to the Computer Manager whenever critical faults occur. It can be combined with a Computer Manager workstation to centrally manage as many as 1,000 AT&T 3B2 and AT&T 6386 Workgroup System computers running on Unix System V, the vendor said.

Computer Manager and Computer Manager Agent are slated to be available this month for $10,495 and $495, respectively.

AT&T
One Speedwell Ave.
Morristown, N.J. 07960
800-247-1212

Modems

Vocal Technologies Ltd. has introduced the Stowaway 9624 Fax/Data modem, a pocket-size device designed to handle data communications requirements for portable and desktop computer users.

The Hayes-compatible modem offers autodial and autoanswer features, tone and pulse dialing, nonvolatile memory, status lights and facsimile support software. Its software enables fax messages to be viewed and printed and provides support for printers such as Hewlett-Packard Co.'s Laserjet.

The product also includes a 40-character command buffer and menu-driven software that enables messages to originate as ASCII files or graphic formats.

It sells for $645 with a one-year warranty.

Vocal Technologies
3032 Scott Blvd.
Santa Clara, Calif. 95054
408-980-5181

Electronic mail

British Telecom, Inc. has unveiled an electronic directory that enables users to access individual and departmental data stored in a computer and to connect calls by touching a single button.

Cohort 500 can display an employee's name, location and position alphabetically by name, department or job title or graphically in an organization tree.

The product can be used on IBM Personal Computers and compatibles; IBM, ICL North America and Unix platforms; and Digital Equipment Corp., Hewlett-Packard Co. and Sun Microsystems, Inc. machines. Pricing ranges from $34,000 for entry-level systems to $336,000 for large units, the company said.

British Telecom
150 E. 58th St.
New York, N.Y. 10155
212-297-2672

USE YOUR SNA BACKBONE TO LINK TCP/IP LANS.

The OpenConnect®/IP Router Connects IBM®'s SNA Environment and TCP/IP LANs.

Linking physically separated or geographically dispersed networks running TCP/IP can be an expensive problem. You need dedicated and redundant data lines, extra routing hardware and some kind of network management system. Mitek OpenConnect Systems℠ now offers a solution which eliminates much of the expense associated with TCP/IP internetwork routing, because it uses the existing backbone of your SNA network.

The OpenConnect/IP Router

The OpenConnect/IP Router allows you to route and transfer data packets from one TCP/IP network, over your SNA backbone, to another TCP/IP environment. Data packets are "enveloped" and transferred transparently to another computing environment around the corner or around the world. This eliminates the need for additional circuits, wiring, extra routers and the high cost associated with each. The OpenConnect/IP Router solution also gives you comprehensive, centralized network routing control of remote LANs by allowing IP traffic to be routed over your proven SNA topology. The OpenConnect/IP Router package includes a Control Program for routing table administration, which can reside on an IBM VM or MVS mainframe or AS/400® mid-range system.

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The OpenConnect/IP Router supports PU 2.0 and PU 2.1 definitions and is fully compatible with the OpenConnect line of servers. The OpenConnect/IP Router supports NetView® and provides full connectivity to IBM's TCP/IP.

The OpenConnect/IP Router package protects your current network investment, provides for centralized network routing control, and allows for maximum network utilization by providing access to all devices on the various networks. For more information, please contact Mitek OpenConnect Systems today.

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MANAGER'S JOURNAL

EXECUTIVE TRACK

Lawrence "Pete" Bates has been named vice-president of information services at **Businessland, Inc.** in San Jose, Calif. He now reports to Douglas C. Johnston, senior vice-president of product operations.

Bates, 59, was most recently manager of information technology systems and planning at Raychem Corp. in Menlo Park, Calif., where he oversaw database administration, systems development and network architecture and implemented a system connecting mainframe locations in the U.S. and four European countries.

Bates spent a total of 17 years at Raychem, holding a variety of positions, including MIS director for Europe, for U.S. field operations and at the corporate level.

Bates holds a bachelor's degree in civil engineering from Stanford University.

……

Randy Reinhart has been appointed microcomputer specialist/local-area network administrator at **St. John Hospital** in Nassau Bay, Texas.

Reinhart was previously regional communications manager at Rural/Metro Corp. of New Mexico/ Texas. Prior to Rural/Metro, he was director of the Microcomputer Training Center at Richland College in Dallas.

He holds a bachelor's degree from North Texas State University and a management degree from Baylor University.

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Who's on the go?

Changing jobs? Promoting an assistant? Your peers want to know who is coming and going, and *Computerworld* wants to help by mentioning any IS job changes in Executive Track. When you have news about staff changes, be sure to drop a note and photo or have your public relations department write to Clinton Wilder, Senior Editor, Management, *Computerworld*, Box 9171, 375 Cochituate Road, Framingham, Mass. 01701-9171.

Adding systems to a quality mix

Alliant's LaGro eyes a healthy dose of IS for hospitals to function more effectively

BY ALAN J. RYAN
CW STAFF

Newcomers learn early that when you are an executive in Louisville, Ky., you schedule few meetings — if any — during the week of the Kentucky Derby. The city is swept up in the throngs of race fans, jockeys and some of the speediest racehorses on earth.

By mid-May, with the blush of the Derby faded for the year, thoughts once again turn to the business at hand. In Parry LaGro's case, that means positioning the information services department of Alliant Health System at the starting gate of what could be a new era in health care information.

LaGro, 31, vice-president of corporate information services at Alliant, says information systems plans being implemented today should lead to increased automation and improved quality for patients by the end of the year. In the health care industry, that is not a goal to be taken lightly.

Michael Wilson

Alliant's LaGro *aims to put his company at the forefront of information systems for health care patient tracking and billing*

Slow going

The medical community has accepted and relied on medical innovation and technology — including the fifth infant heart transplant in the U.S., performed at Alliant's Kosair Children's Hospital in 1986 — but information technology has made few inroads beyond its most routine uses, LaGro says. Basically, he says, information technology has been used to simplify just one process: patient billing.

Medications given to patients, surgical and nonsurgical procedures, types of illnesses and duration of hospital stays are tracked from a cost/billing perspective, but the information is not integrated and is not used beyond the billing process. LaGro says he believes there is a better way.

"I firmly believe you can improve the outcome for patients in medical care, and I believe information systems can do this" by being able to tie together all factors of a patient's care, LaGro says. He adds that one of the reasons he took the job at Alliant last year was because the corporation's officers share that vision.

Alliant has been moving in that direction since its inception last June. NKC, Inc., one of the two health care organizations that merged to form Alliant brought its Total Quality Management approach for health care to the Alliant formation. The Total Quality Management process got its start with the foresight of James R. Petersdorf, the former president and chief executive officer of NKC, who died in 1987. Petersdorf believed that by tracking quality indicators in the health care process, the care given to patients could be continually improved.

When quality measurement was introduced at NKC, all departments had to participate. The organization's man-

Continued on page 66

Don't let '90s demographics get you down

BY CLINTON WILDER
CW STAFF

Topping the list of depressing facts that information systems executives would rather not think about are the demographics of the 1990s.

Just for starters, the U.S. work force will grow more slowly than at any time during the last 60 years, and the percentage of college freshmen who said they prefer a career in computers plunged from 8.8% in 1982 to 2.2% in 1987. We won't even start discussing the declining Scholastic Aptitude Test mathematics scores and the general health of secondary education in the U.S.

At the same time, of course, the demand for qualified employees with both technical and business skills is at an all-time high. What is an IS department to do?

Be innovative and creative, according to The Diebold Group, Inc., a New York-based management and IS consulting firm. Rethink traditional methods of recruiting, hiring, rewarding and promoting your employees.

"To identify and recruit in an environment of scarce labor, IS executives should explore the innovative ways that some companies have taken to recruit and retain qualified people in their organizations," said John M. Michaud, a Diebold senior associate.

Michaud recommended making changes such as the following:

- Look beyond the traditional pool of IS talent when recruiting. Expand your efforts to include internal employees outside IS, liberal arts graduates and MBA holders.
- Design new career paths and offer lateral development education and reeducation to enable and encourage those paths.
- Forge new cooperative links with schools and universities. Provide opportunities for internships and work-study programs. Encourage your own people to influence curriculum development and teach IS courses at local universities.
- Explore rotational systems that will enable IS professionals to work in other functional areas of the organization.
- Make strategic use of compensation. Creative incentive plans, discretionary bonuses and stock options can effectively attract and retain IS talent.

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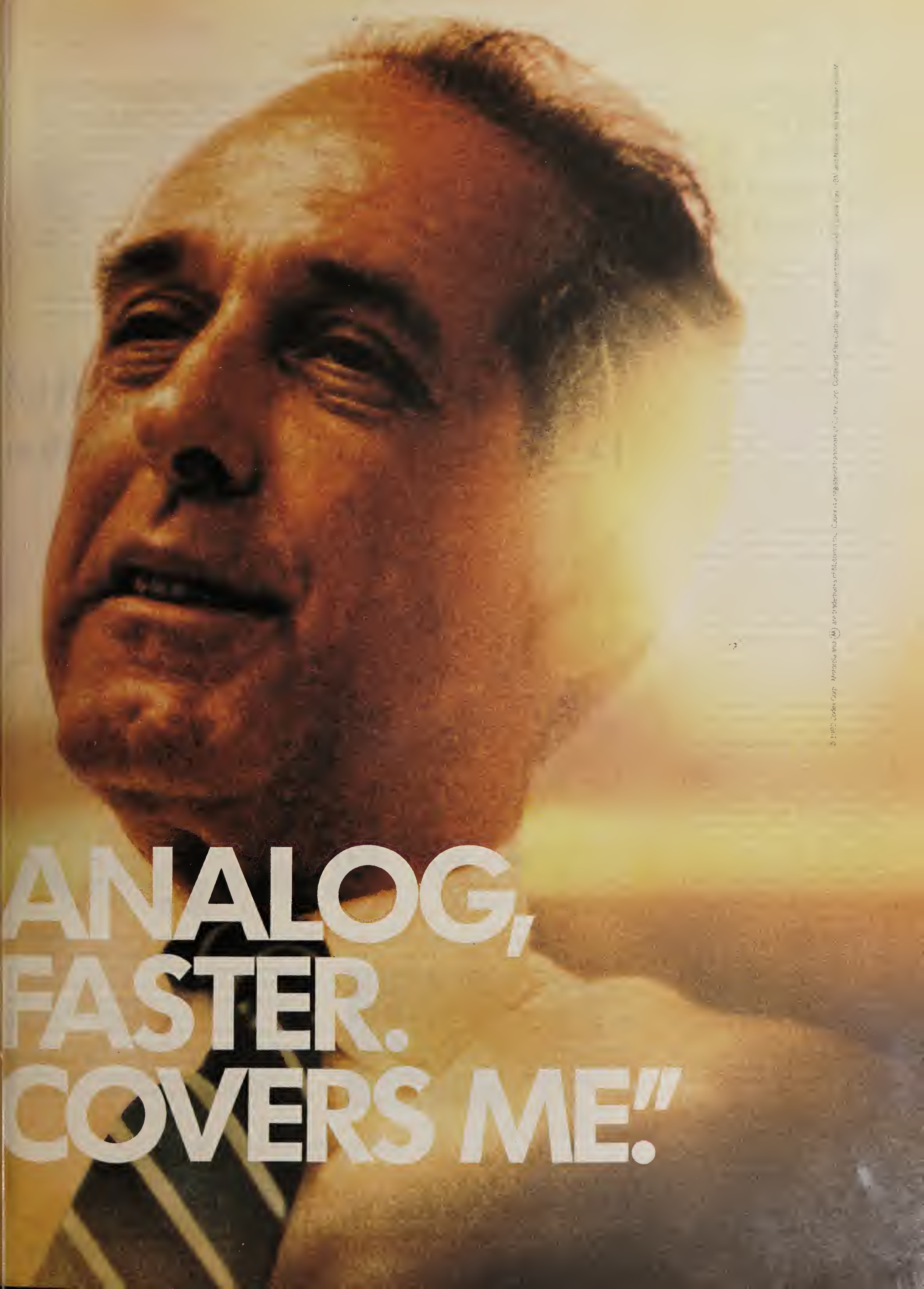

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TAKING CHARGE

Les Gilliam

Heading off a distributed fix

What are the dangers of distributed computing and how can they be removed or at least controlled? Several of these pitfalls and suggestions for management action are discussed below.

First, let's look at the problems.

Lack of user management involvement. The typical user manager does not view the computing function as primary and does not understand the technology. Therefore, it is convenient to just turn it over to the techies. When this happens, a technical focus prevails, to the exclusion of sound management practices. Applications may be produced, but there will be a lack of completeness in many vital areas.

User independence. When users acquire their own computing resources, there will be a strong motivation to show that they are capable of success. This creates a desire to be independent of the mainframe group in every way and adopt the "I want to do it by myself" attitude. The reinvention of the wheel syndrome kicks in, and the same old mistakes are made once again.

Inexperience. This is not a reason to reject the distributed alternative. But a learning curve must be accepted for both technical and management skills so that unrealistic expectations do not lead to disappointment.

Incompatibility and isolation. When the user department is given complete freedom of choice, the pitfalls of incompatibility and isolation are created. Access to networks and other processors, electronic mail, volume discounts, interdepartmental career paths and centralized training and support as well as data exchange are all jeopardized.

Inadequate security. Not the least of the weaknesses with distributed or departmental computing systems is the lack of security, be it physical, information or access security. User departments may lack adequate and timely information backup, a disaster recovery plan and proper control over physical or terminal access to the system.

Unnecessary costs. Cost savings are sometimes missed in the distributed computing environment because of the lack of centralized buying for volume discounts, duplication of resources and the inefficiencies created by lack of experience and management involvement.

Central group arrogance. In some places, the "mainframe only" mentality still exists. The central group may feel threatened or have a know-it-all attitude. This often results in conflict or the refusal to share experience or offer support.

For the thoughtful manager moving to distributed computing, solutions to these problems do exist. Here's a look at some solution ideas:

Policy. In order for senior management to protect their investment in computing resources and maximize the return on that investment, they should prepare and publish a corporate computing policy.

The policy should make clear to management and employees that all computing resources are corporate assets and are to be treated as such.

The policy should explain the requirement for a complete security program for all computing and telecommunications.

Also included should be the requirement for a disaster recovery plan, frequent changes of passwords, documentation of all applications essential to business operations and any other standards or guidelines needed to fulfill the objectives of the policy.

Standards. To ensure continued compatibility, standard architectures for various types of computing and networks should be established and enforced. Farsighted managers will demand strict control over these resources.

Security. Protecting any type of corporate asset costs money. It is no different with computing and telecommunications resources. A complete security program will include physical, information and access security. Access security is becoming an even more critical issue with the rising need for electronic data interchange with those outside the company.

Education. Many problems that arise with distributed computing could be avoided if proper education and training, both management and technical, were provided. Too often, management would rather avoid the cost and employee time constraints for training, and the technical types usually can't wait to get their hands on the new products.

Central support. Another solution to the problems with distributed computing depends on the willingness and ability of the central computer group to provide leadership and support to the user groups. But, again, this support costs money and someone must pay the tab. Salesmanship and management directives are often necessary to make such cooperative relationships successful.

Gilliam is president of Gilliam Associates, a computer management consulting firm based in Ponca City, Okla.

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BOOK REVIEW

Solution After Next: Solve today's problems with tomorrow in mind

BREAKTHROUGH THINKING
By Gerald Nadler and Shozo Hibino
Prima Publishing & Communications, $19.95

If you believe there is a single right answer to any problem and the best way to find it is to gather as much information as possible, you are probably going to hate this book. If the maxim "don't reinvent the wheel" is a tenet of your management philosophy, what is under this book jacket will strike you as heresy. If you are irritated by ambiguity and frustrated by people who are forever asking, "why?" you shouldn't open this volume unless there's a blood-pressure monitor handy.

There's no question about it — *Breakthrough Thinking* is an unsettling book. The authors meant it to be. It is their contention that a lot of what has gone wrong with U.S. business and industry stems from habits of thought that are generally grounded in Western traditions of scientific management and problem-solving by subdivision and analysis. "If you follow so-called scientific orthodoxy, dictating that problems are to be subdivided, analyzed and reduced to their smallest components," the authors say, "you are going to get results that are small, detailed and not reflective of human capabilities."

What Nadler and Hibino advocate is a total mental reorientation to a model that blends Eastern and Western modes of thought. Their partnership represents this kind of blending. Nadler, an American, is not only a consultant but also IBM professor of engineering management and chairman of industrial and systems engineering at the University of Southern California. Hibino is professor of planning and design at the Chukyo University School of Sociology in Nagoya, Japan.

Looking at those credentials and the number of times Japanese executives turn up in the book as examples of breakthrough thinking, it would be easy to label their joint thesis as a case of an American engineer meeting a Japanese philosopher and falling prey to that common malady, Japan fever. In fact, the reality and their message are a lot more complicated.

Nadler and Hibino are not just yin and yang. Individually, each embodies the kind of whole-brain, cross-disciplinary, scientific-liberal arts, rational-intuitive mix that they say we should all try to bring to problem-solving. Nadler isn't just an engineer and information systems designer; he has also been a vice-president of operations at a manufacturing company and holds the patent for a technique to measure the velocity of human limbs. Hibino isn't just a social scientist; he also holds an advanced degree in electrical engineering and does IS consulting.

Furthermore, neither one is suggesting that the U.S. look to Japan for answers. There has been far too much of that already, they say, just as there has been too much grabbing for pretested, ready-made solutions. "The landscape is white with the bleached bones of impulsive idea borrowing," they say. "Failed organizational programs designed to improve the quality of working life or delivery systems or productivity have left behind a trail of distrust and ill-will . . . All such ideas are monuments to what we call the technology trap or the cloning myth."

If using precedent as a guide is a mistake, how is a manager supposed to solve all those nasty problems that keep getting in the way of profitability and productivity? A lot of other things can be done, Nadler and Hibino say, and one good way to start is to work on your definitions.

Solution is one word that has no place in the breakthrough thinker's vocabulary — at least as currently defined. Solution, as most people understand it, implies finality and closure, the authors say. Positive change involves constant adjustment and refinement. One of the seven pillars of breakthrough thinking is The Solution After Next principle, which says that whatever change or system is installed in the present should be based on what the solution might be when you work on the problem the next time around.

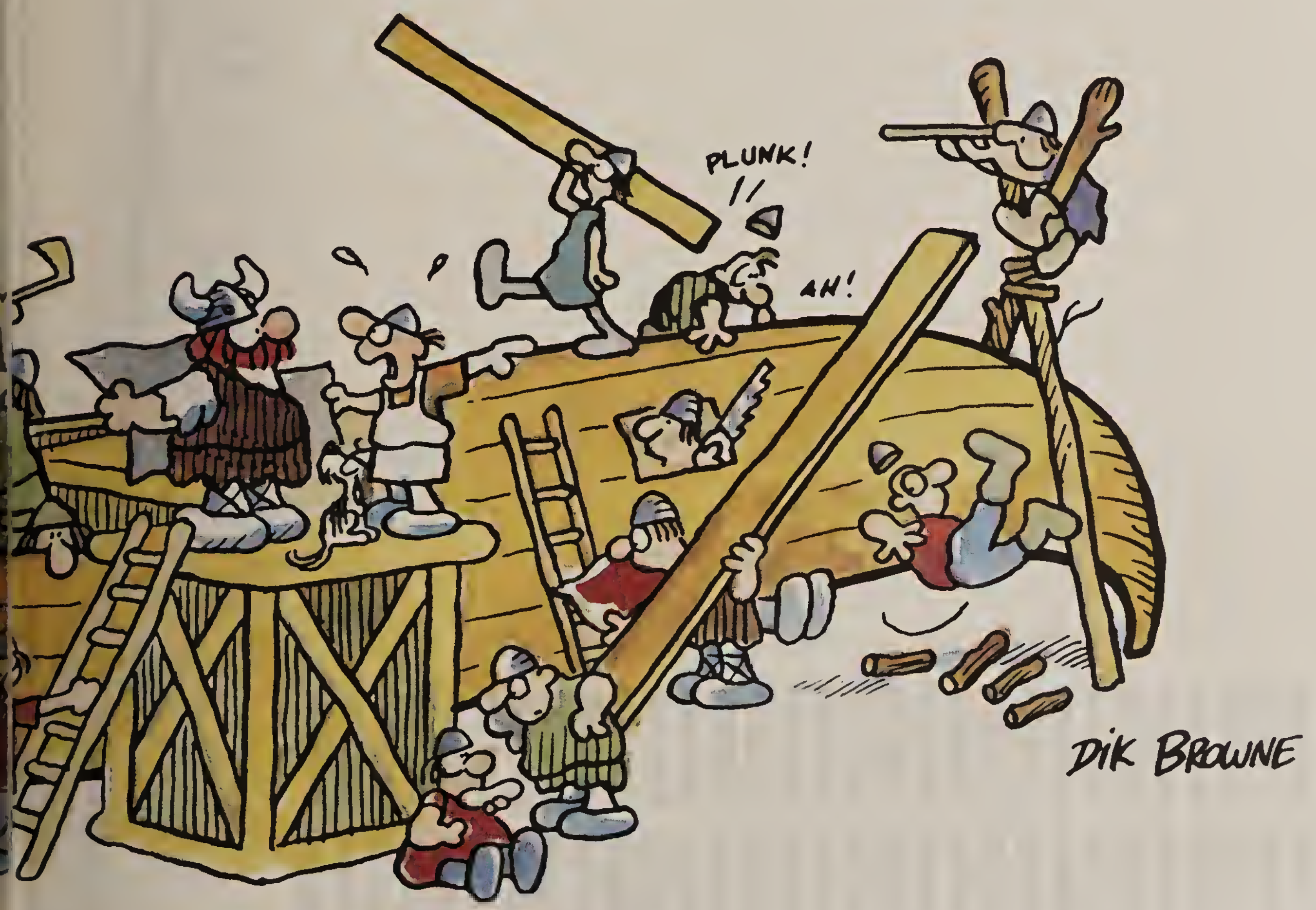
That may sound depressing, but it isn't. Nadler and Hibino aren't saying that problems never go away; just that no system or strategy remains effective forever. It is easier to anticipate improvements and tune something regularly than to wait until your first fix falls apart. They also say there should be a formal schedule for reviewing how changes are holding up. That's item No. 7 on their list — the Betterment Timeline Principle.

It could be argued that some of these concepts might have been given catchier descriptives. One might also have wished for a fewer lists and a lot less self-congratulatory sell in the introduction. These flaws are minor, however, and worth overlooking. Jump in at Chapter 1 and resist any urge to scoff or jeer as the authors talk about problems as opportunities, because by the end, you'll remember your initial cynicism with embarrassment.

JOANNE KELLEHER

Kelleher is a *Computerworld* features editor.

6000™ family.
will seem downright primitive.



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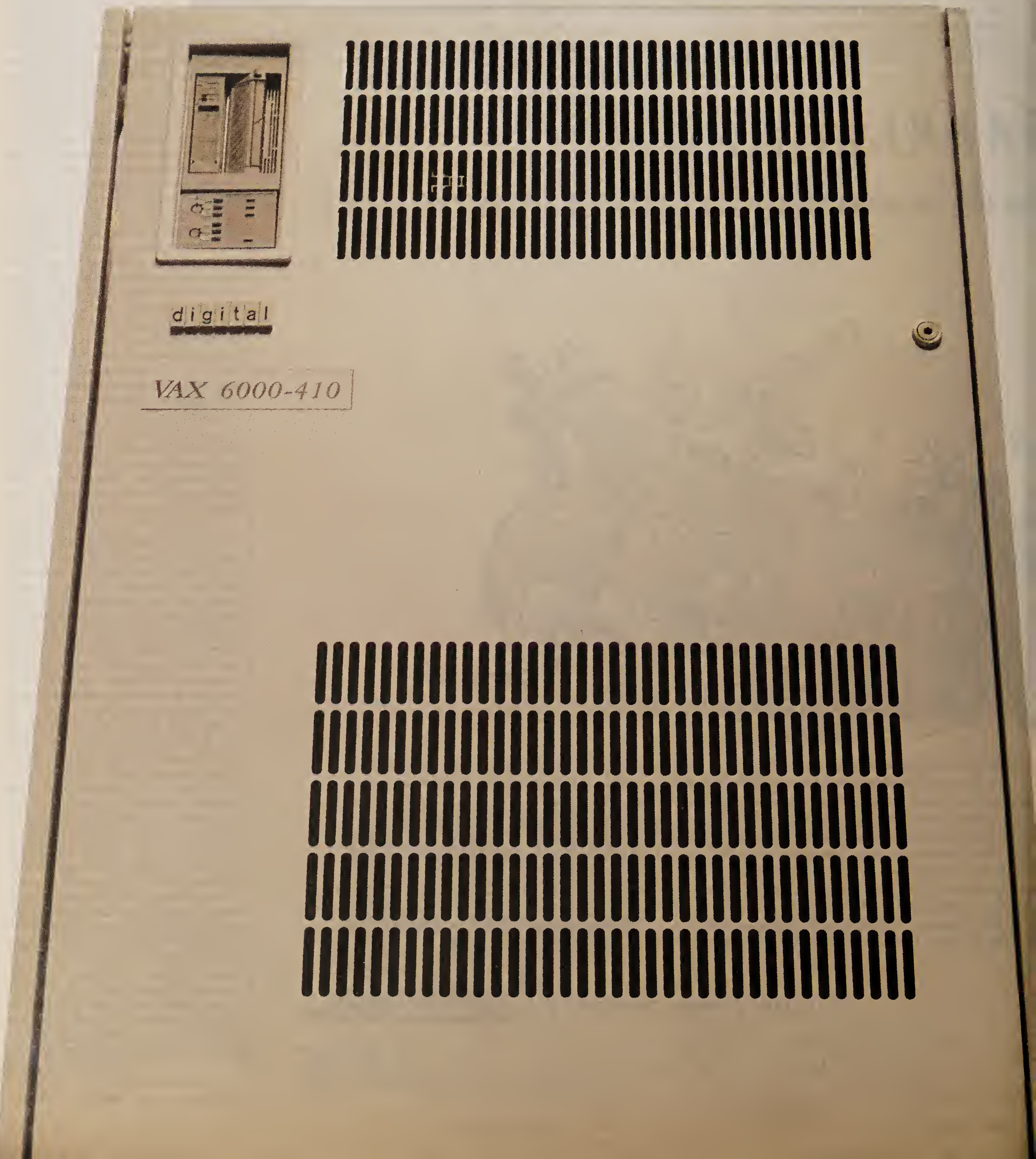

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Quality

FROM PAGE 59

agement structure flattened, and work-group teams were formed to make decisions on what was best for their departments. Quality is now such a strong mandate that Alliant has a vice-president to oversee the quality process and an executive vice-president to ensure that the quality process happens corporatewide.

The first phase of LaGro's plan is to automate the quality tracking processes at Alliant by the end of 1990. Now, it is done on paper.

"IS is the inhibitor here," he says. "We have improved processes manually. I want to bring systems to the process to see how they can help to improve it further."

Commitment is key

Stephen Williams, an Alliant executive vice-president, says that systems commitment is fundamental to the quality management process, a process he says is without question the key critical success factor for the company.

LaGro is the right person to take Alliant down that road, Williams adds. "The breadth and depth of his vision, his ability to conceptualize and understand what the corporate goals are and to think nontraditionally about information systems" were what sold the Alliant board on LaGro, he says.

Williams says LaGro clearly understands the integration of health care management, quality management and IS, and the role of IS in bringing the quality process to health care. "Parry is one of the few people in the country who has bridged that gap conceptually," he says.

As with all other Alliant departments, the quality processes have been introduced within IS. The department has a staff of 50 and a $4 million budget, LaGro says, but has only three IS managers. There are no supervisors or directors in IS.

"We are also moving aggressively toward self-managed work groups," he says. LaGro says many of the quality concepts are borrowed from what Alliant workers have learned from Florida Power & Light Co.'s quality program [CW, Dec. 11, 1989]. Alliant has sent many of its systems workers to Miami to observe the quality process at Florida Power & Light.

It has not been a flawless road, LaGro acknowledges. "When a crunch time comes, some people want a manager to make the final decision," he says, and with the self-managed work teams, that is not going to happen.

LaGro's own two-day introduction to Total Quality Management left him somewhat skeptical. "I thought it was great, but I couldn't believe anybody was really doing it," he says.

For now, the IS workers "focus on the outcome and requirements of our clients — whether they are accounting or clinical systems," LaGro says. That focus will carry over to help automate the quality program. "Why put in systems if they can't improve the critical success factors?"

For instance, LaGro says, it would be useful to have the ability to track a patient's illness from diagnosis to hospital admission, anesthesia, actual surgery and recovery. "None of the systems we have today track that kind of information," he says.

LaGro says the technology is available to track quality indicators in other industries, but few vendors have been willing to build such systems for the health field. "I believe we are close to the decision to say we have to build our own systems," he says.

Database building

Alliant is using the quality indicators it gathers to build its own database structures for future reference. Indicators might include length of surgical incision, number of X-ray retakes, duration of hospital stay for patients, readmission rates, reinfection rates, patients' range of motion following surgery, patient opinions and the cost of running one hospital area per admission.

"By tracking those indicators, we can make better strategic decisions," LaGro says.

Health care in the genes

For Parry LaGro, it was never a question of what career to choose — health care was in his blood. There was, however, the little matter of deciding which area of the field to explore.

At 31, LaGro — who has a background in economics — has found his niche. He has been vice-president of corporate information systems at Alliant Health System for nearly a year and has already overseen the merger of the systems areas of the two corporations that last summer came together to form Alliant.

LaGro's father is the chief executive officer at a small hospital in Michigan, his wife is a former X-ray technician, his sister is a medical technologist, and lots of his relatives are registered nurses. He says his initial choice of a career in hospitals was of his own volition — but his foray into systems was not.

"I had had Fortran programming in college and hated it and said I didn't want anything to do with this," he recalls. However, when a former boss said systems knowledge would be a good way for LaGro to distinguish himself from all of the other finance people, LaGro decided to make the effort.

Michael Wilson

Parry LaGro *says he originally looked at systems work as just a way to pad his resume*

"My boss was going to be retiring, and he was concerned with who was positioned in the organization to drive information services where they need to go in the future," LaGro says.

That was in 1981 in Kalamazoo, Mich.'s Bronson Methodist Hospital, and it was also the year LaGro graduated from the University of Michigan.

He started working with financial software such as Microsoft Corp.'s Multiplan and Software Arts, Inc.'s Visicalc to see how they could aid the finance process.

In the fall of 1981, Bronson Methodist brought in consultants Nolan, Norton & Co. to see how systems could be used to improve the hospital's operations. LaGro's boss once again encouraged him to get involved and sent him to work with the group on a part-time basis.

"That was the first time I got involved with looking at IS from a conceptual, long-range approach, and I enjoyed it," LaGro says. "I thought, 'This is what I'd like to do.' "

After that initial experience with IS, LaGro began to look at IS in tactical terms. "We spent lots of hours talking about what are the outcomes that we are trying to achieve, where should we be heading, and what kinds of systems, platforms and architectures we should have," he says.

Several years later, LaGro moved into a top IS role at Bronson Methodist. However, he found that people who had previously looked to him for overall objectivity suddenly thought of him as a technical guru — a change he did not appreciate. Additionally, he had to prove his credibility to an IS staff comprising people his own age who had technical experience.

After three years, he had had enough. LaGro says he aspires to a CEO position in health care, but feels that being in IS at Bronson limited his career path there. Still, the experience was worthwhile. "Working in IS forced me to understand the operations and how to use technology appropriately," he says.

When he had made the decision to move from Bronson, LaGro says, he looked for a hospital where people fundamentally believed that technology could help in more than just financial functions.

"That requires a significantly different type of culture and style" than most health care organizations, he says. Alliant fit the bill.

LaGro's timing was convenient. As a newcomer trying to merge two separate data centers, he was not caught in the "us vs. them" syndrome, as he had no special loyalties to either side. The merge took place between July and October and brought about a savings of approximately $60,000 per month, he says. The applications are not yet all merged, however.

Alliant is a $300 million corporation comprising three metropolitan hospitals in health care mecca Louisville, Ky., which is also home to Humana, Inc. With 4,000 employees, Alliant is one of the largest employers in Kentucky.

Michigan native LaGro moved to Louisville last spring with his wife and two daughters — just weeks before the not-for-profit Alliant came into being during the June merger of NKC, Inc. — which comprised Norton Hospital and Kosair Children's Hospital — and Methodist Evangelical Hospital.

ALAN J. RYAN

CALENDAR

JUNE 17-23

Image Processing Conference. Boston, June 18-20 — Contact: Andree Fontaine, Wang Institute of Boston University, Tyngsboro, Mass. (508) 649-9731.

International Conference on Testing Computer Software. San Francisco, June 18-21 — Contact: U.S. Professional Development Institute, Silver Spring, Md. (301) 445-4400.

Association for Computing Machinery Sigplan '90: Programming Language Design and Implementation. White Plains, N.Y., June 18-22 — Contact: Mark Scott Johnson, Sun Microsystems, Mountain View, Calif. (415) 336-7758.

JUNE 24-30

Total Quality Management Conference. Washington, D.C., June 25-26 — Contact: TMSA Conferences, Torrance, Calif. (213) 534-3922.

Advanced Intelligent Network. Dallas, June 25-26 — Contact: National Engineering Consortium, Chicago, Ill. (312) 938-3500.

Empowering the User: The Design of Human-Computer Interfaces. College Park, Md., June 25-27 — Contact: University of Maryland University College, College Park, Md. (301) 985-7206.

Performance & Databases Conference. Ottawa, June 25-27 — Contact: M.B. Foster Associates, Chesterville, Ontario, Canada. (613) 448-2333.

Auditors Association Multiconference. New York, June 25-29 — Contact: EDPAA, Carol Stream, Ill. (708) 682-1200.

Dexpo East (DEC Computing & Connectivity Exposition and Conference). Boston, June 26-28 — Contact: Expoconsul International, Princeton, N.J. (609) 987-9400.

National Conference and Exposition on Geographic Information Systems-East. Washington, D.C., June 26-28 — Contact: USPDI, Silver Spring, Md. (301) 445-4400.

Seybold Digital World Conference. Beverly Hills, Calif., June 26-28 — Contact: Seybold, Malibu, Calif. (213) 457-5850.

Worldwide Personal Communications. Dallas, June 27-28 — Contact: National Engineering Consortium, Chicago, Ill. (312) 938-3500.

Data Administration in the 1990s. Anaheim, Calif., June 27-29 — Contact: Performance Development Corp., Princeton, N.J. (609) 921-3770.

Independent Computer Consultants Association National Conference. Orlando, Fla., June 28-30 — Contact: Belva Carr, St. Louis, Mo. (800) 438-4222.

JULY 8-14

Information Center Conference and Exposition. San Francisco, July 8-12 — Contact: Weingarten Publications, Boston, Mass. (617) 542-0146.

American Production and Inventory Control Society Seminar and Exhibition. San Francisco, July 9-11 — Contact: APICS, Falls Church, Va. (710) 237-8344.

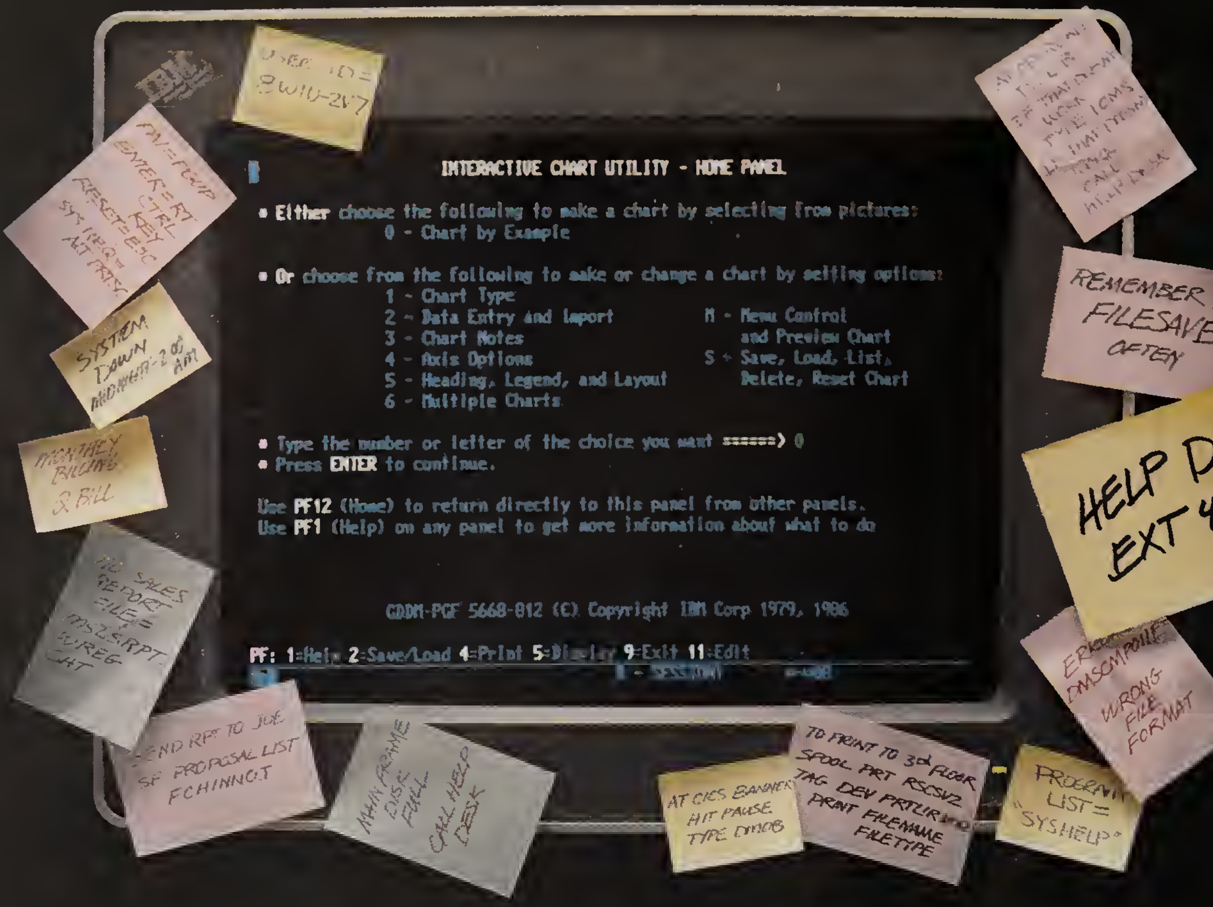
Navy Micro '90 Conference. San Diego, July 9-12 — Contact: Nardac, San Diego, Calif. (619) 545-8645.

SPECIAL REPORT

PCs: THE FIVE-YEAR VIEW

The desktop in 1995: Experts have their say

- **Multimedia makes it big on the PC scene**. Page SR/27
- **The look of laptops**. Page SR/24
- **An interview with Stewart Alsop**. Page SR/13



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                  INTERACTIVE CHART UTILITY - HOME PANEL

• Either choose the following to make a chart by selecting from pictures:
          0 - Chart by Example

• Or choose from the following to make or change a chart by setting options:
          1 - Chart Type
          2 - Data Entry and Import          M - Menu Control
          3 - Chart Notes                        and Preview Chart
          4 - Axis Options                   S - Save, Load, List,
          5 - Heading, Legend, and Layout        Delete, Reset Chart
          6 - Multiple Charts

• Type the number or letter of the choice you want ======) 0
• Press ENTER to continue.

Use PF12 (Home) to return directly to this panel from other panels.
Use PF1 (Help) on any panel to get more information about what to do

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PF: 1=Help 2=Save/Load 4=Print 5=Display 9=Exit 11=Edit
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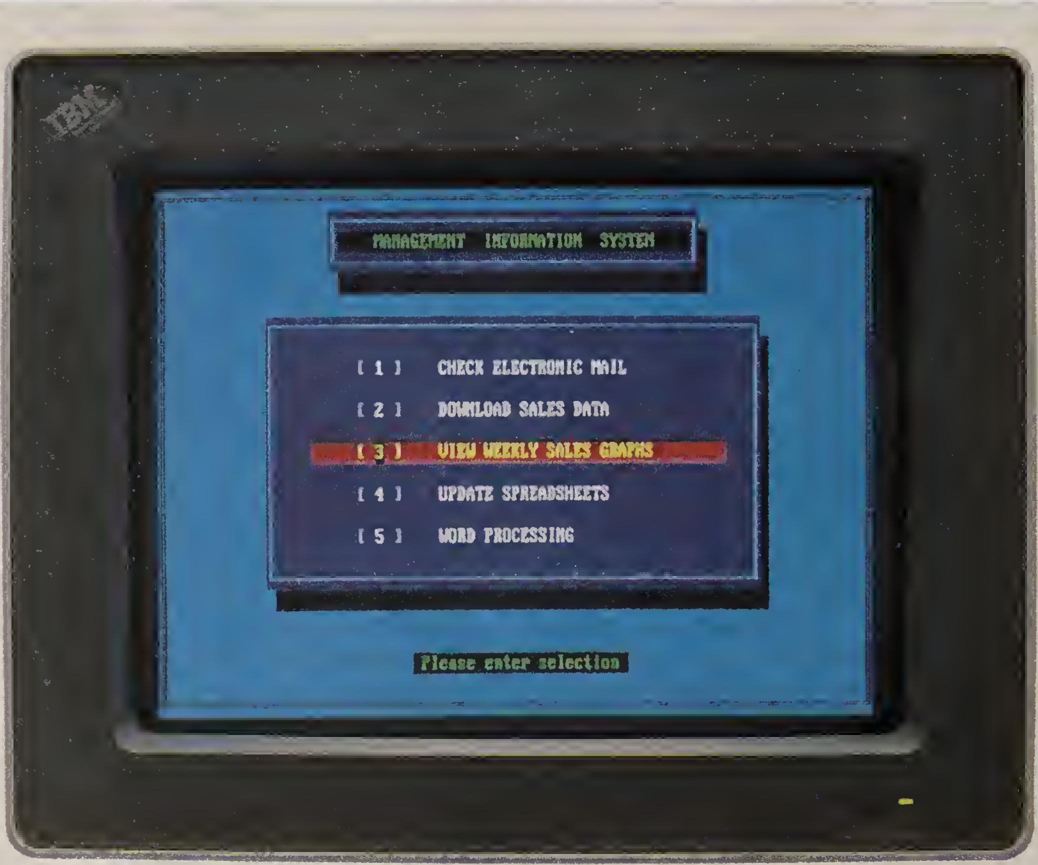

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MANAGEMENT INFORMATION SYSTEM

[ 1 ]   CHECK ELECTRONIC MAIL
[ 2 ]   DOWNLOAD SALES DATA
[ 3 ]   VIEW WEEKLY SALES GRAPHS
[ 4 ]   UPDATE SPREADSHEETS
[ 5 ]   WORD PROCESSING

Please enter selection
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Work-group computing will turn conventional PC computing on its ear. Page SR/31.

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Andrzej Dudzinski

What's in store for 1995? PCs will fulfill potential

Corporations can expect power, productivity and payoffs

BY AMY WOHL

In five years' time, we may be able to close the gap between reality and potential in personal computer productivity.

The formula is at hand. Smart companies have already discovered that computer power, properly applied, permits human labor and human knowledge to be leveraged in economically interesting ways. These companies know that the trick is to invest their money and time in technology that promotes synergy at all levels and ties directly into the business process.

By the time the decade reaches the halfway mark, desktop devices purchased in the early 1980s — the beginning of the PC era — will have been retired and replaced by machines large enough (in memory size and processing power) to use powerful, friendly graphical user interfaces. These workstations will be connected to one another by local-area networks and supported by servers, larger hosts for special purposes and a variety of software.

Increased capacity and connectivity will permit work created in the office to be largely supported on the system.

By 1995, traveling workers will use laptop technology (without the need for reinforced laps, because these tools will get lighter) to stay in touch with their work. Travelers' kits will drop out of use as laptops include cellular telephones. Cellular phones will enable users to establish connections with office systems without the use of standard telephones or modems.

Work comes to you

All of this interconnection means that the notion of the work group will expand. Instead of a group of co-workers located in physical proximity, the term will stretch to cover any group of people with common work interests, wherever they are. Hewlett-Packard Co. calls this a "virtual work group."

Multimedia will permit users to be a part of a meeting anywhere, as long as they can hook their laptops into the conference call. Setting aside considerations of where you are and whether the bandwidth there is adequate, everything from the viewing of common documents to the scrutiny of facial expressions is possible.

The biggest problem in this information-rich environment will be management of information. There will be so much data that keeping track of what we have and finding the exact piece we're looking for will become very difficult.

With so many users sharing information, indexing and search schemes will become very important because, without them, agreement about labels for information would not be practical.

Even more important, however, will be tools to categorize, filter and customize data to individual needs. The goal will be to have a personal agent, embedded in software, whose job it is to help you deal with information. This agent would seek out files it thinks you might find useful and offer them to you (delivering them in full only if you want them); it would filter all the information sent to you, sort it, delegate it, attach information to it — rather like a good, old-fashioned secretary, but one that's on duty 24 hours a day, never takes vacation and never makes a mistake.

The following tools that approximate this function are just appearing in the marketplace:

- Complex search processes that can repetitively search very large general information bases, such as on-line information services, looking for very specific types of information.
- Custom daily news services on your computer, delivering your version of the daily news — just the topics you're interested in.

A few of the best firms have already begun to move into this future. They are building sales automation systems, customer service systems and all kinds of integrated systems that profoundly change how they handle paper and information and their employees' interactions with both.

These systems have big payoffs. One early IBM customer, United Services Automobile Association in San Antonio, loves its system (a combination of scanning, optical disc storage and procedural processing in an insurance application with huge productivity paybacks) so much that it has set up thousands of customer visits to show it off. A somewhat similar Canadian government installation cut the backlog of processing requests from three weeks to 24 hours.

There is almost always a long lag between the early implementers and the rest of the corporate population, however, because there are always plenty of reasons for hanging back. Companies always feel too busy. Adding one more project just doesn't feel possible. Empire builders fear change will cut into their power. Users fear change will undermine their competency, even in small ways (like knowing how to use a particular piece of software).

> THIS AGENT would seek out files it thinks you might find useful and offer them to you; it would filter all the information sent to you, sort it, delegate it, attach information to it.

Change is messy and chaotic; bureaucrats set high values on neatness. The change process is expensive — new machines, new software, training, work loss due to chaos; the gains come only later and may initially be hard to see and measure. All these are votes to maintain status quo.

Human nature won't alter radically in the next five years. All the usual obstacles will continue to impede technological progress. On the positive side, however, there are forces at work that will keep the momentum rolling behind effective technology use. New hardware and software will continue to flood into the market, and prices will continue to drop. Desktop connections will increase and multiply until even the penny-counters will be impressed with the kinds of productivity gains they can achieve. ●

Amy Wohl *is the president of Wohl Associates in Bala Cynwyd, Pa., and editor of "The Wohl Report on End-User Computing" newsletter.*

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Graphical user interfaces: Beyond fun and games

Andrzej Dudzinski

Business software developers will follow in game industry's footsteps

BY JUDITH S. HURWITZ

If you want to know what the next generation of user interfaces will be like, ask a member of the next generation if you can borrow his computer game.

The Playroom is a child's computer game that my 3-year-old likes very much. It has many levels of operation; some actions take him deep into functions and applications ranging from repeating letters to creating words to a series of simple games. He understands that to get back to the beginning, he needs to return to "the playroom." If he wants to play a game, he has to take it off a bookshelf in the playroom.

What does a child's computer game have to do with the next generation of user interfaces? Quite a lot. What is interesting about *The Playroom* is the intuitive nature of its interface. A playroom is a metaphor that a 3-year-old understands without explanation; for him, a shelf is an obvious place to find games. During the next five years, user interfaces will develop to the point where they will reflect the way we work, using metaphors that are most appropriate to what we do.

Quick-change aritist

User interfaces of the next few years will make it possible for individuals to use technology to improve their businesses' competitiveness. As organizations take on a flatter structure in order to serve customers better, executives and managers will want the ability to understand changing conditions and to change a service they provide at a moment's notice. There will also be a greater need for ad hoc groups of experts to come together to work on targeted short-term projects aimed at helping their customers.

Technology intended to help groups accomplish this type of work will rely on user interfaces because they will allow multiple people to work simultaneously on different parts of the same project. In other cases, they will enable people to work independently on discrete parts of projects that will be consolidated in the end. Graphical interfaces are key to keeping track of what is going on in an environment because they keep users aware of what each person is doing.

It has been obvious to game and educational software developers that if their software is not graphical, easy to access and fun, they will lose their audience. Somehow, business software developers haven't gotten that message — but that will change within the next few years.

Ironically, when most people talk about graphical user interfaces, what they are talking about is a graphical windowing environment. Over the next decade, there will be a growing distinction between windowing environments — which put a series of icons onto a screen — and graphical user interfaces — which have graphical objects in the shapes and schematics of particular business processes that can be manipulated.

For example, the graphical user interface for a pharmaceutical lab may include graphical test tubes, beakers and molecular models. The staff can manipulate the molecular models or mix in the beakers, mirroring the way they work. Once developers understand the distinction, things will really get interesting.

The API level

Although user interfaces will change depending on the needs of users, user interfaces need to be consistent at the lower technical levels — tool kits and application programming interfaces (API) — so that developers only need to write to one set of protocols. If an application needs to be rewritten for different APIs, developers have to make a choice about which platform to target. This results in a scattered market, with fewer applications available for a specific interface.

And a limited pool of software ultimately hurts the user.

OS/2 Presentation Manager, for example, is becoming the de facto standard for user interface design. Eventually, Microsoft Corp. will create a consistent API for Presentation Manager targeted at both OS/2 and Unix. But where the future of user interfaces becomes interesting is what is going to happen beyond this level.

As soon as standards are set

PRODUCT ANALYSIS
OS/2: THE RIGHT STUFF?
PERSONAL publishing
THE NEW WORLD OF WINDOWS WORD PROCESSORS FOR THE PC
PC WORLD
GEE, WHIZ! LOTUS GOES GRAPHICAL WITH 1-2-3/G
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THE 12 TOP GUIs
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for APIs and basic windowing technology, development in user interfaces will shift to the upper layers — those seen by the end user. User interfaces will begin to be designed on the basis of industries and jobs within those industries.

For example, the user who monitors an industrial process will get a user interface that simulates a control panel. The panel will probably use color to alert that user to problems. It will also include dials and switches.

ACCESS TO real-time data will become an important part of user interfaces in the coming decade.

User environments will follow a model for design but will be customizable. Even within a defined environment, users will want the freedom to change the layout and design of the interface to suit their style of working.

The administrator who manages paperwork may set up a desktop environment that looks like a suite of file cabinets, each labeled for a specific group of documents. The project manager who deals with teams of professionals may want the environment to resemble a series of rooms, with each project's details residing in a separate room. Another person may want a combination of these metaphors.

Eventually, interfaces for grown-up business people will also catch up with games in terms of sound and motion.

Users will be able to use a visual form of hypermedia to go deeper and deeper into information sources.

With hypermedia, a user might use a series of icons or words to represent complex information. When the user accesses an icon, he gets additional information about the issue it represents.

Take, for example, a manager who is planning the introduction of a new product. Using the hypermedia scenario, the manager first selects the product management icon for the specific market to which the product is targeted. The first layer of information to appear on-screen includes basic details, such as product specifications, pricing and the intended target market.

If the manager selects the target market icon, he gets more details about that market. He is then able to access spreadsheets of projected market share. From within this part of the project, he may then access more detailed information about overall economic trends. Levels of information may include a video showing news footage of a business report related to the target market as well as an audio message about the market.

Visual guide

Rather than simply moving statically from one mode of working to another, users will have an interactive video interface that guides them from one part of the business environment to the next. Very few users have just one job, and designers will soon begin to realize that. Even if they do have a single job, there are usually many dimensions and aspects to that position. User interfaces will evolve so that the user will be able to adjust his desktop image to match the tasks he is performing.

For example, a project manager may not only want to have each project put into a separate 'room' within the interface; he may also want to subdivide each project into corners within each room in order to more easily manage each stage of the project. Interfaces will become flexible enough to allow a user to make that sort of change.

Access to real-time data will become an important part of user interfaces in the coming decade. In a competitive marketplace, managers need up-to-the-minute information about the vital signs of the business — not notes buried in a file in a 100-page monthly report. If a manager were able to monitor sales levels for different countries and markets in real time, he'd be able to spot trends in time to do something about them. If there were a sudden downward shift in one territory, the manager could pick up a phone or send a message to that territory alerting it to a potential problem.

Graphical user interfaces will also provide a vehicle for interactive processes on a shared desktop. This data sharing happens in several modes, two of which are video or audio teleconferencing. Part of the desktop will allow users to see or hear each other.

In these sessions, users will be able to point to supporting materials that they want to annotate during the teleconference. They may want to add details to a strategic planning document or make changes to a spreadsheet to illustrate of a new idea. The user interface will have to provide the visual metaphor so that it is easy for these users to communicate with each other and the application at the same time.

An integral component of this capability will be the types of input devices users will have for accessing their desktop. Today, the keyboard and mouse are the most commonly used interaction devices. In the next few years, devices such as track balls will begin to emerge that allow the user to move around the screen with a smooth motion.

Touch and talk

Touch screens will also become a more logical option for accessing information, as the feel of the screen becomes more pleasant and the interface sufficiently graphical and intuitive.

Even more interesting are developments in areas such as voice activation. Users will be able to talk to their systems, asking them to retrieve files and initiate actions. For example, users will be able to annotate documents and spreadsheets by voice, stylus or typing.

This scenario will become especially important as users begin to work on group projects in which more than one individual can comment in real time about the details of a report or program. Someday soon, it will also be possible for a system to translate handwritten information into computer-readable form.

In the coming decade, user interface technology is going to change dramatically. Those involved in developing the next generation of applications should take their cue from the computer game developers. User interfaces should be adventurous, fun, attractive and intuitive. At the same time, they must allow users the flexibility to change metaphors to more accurately reflect the work they do and the way they prefer to do it. •

Judith S. Hurwitz *is vice-president of Patricia Seybold's Office Computing Group in Boston. She is the Editor in Chief of "Unix in the Office," a monthly research report on commercial Unix applications and trends.*

Never have so few done so little for so many

Traditionally, there have been few user interface options, none of which has been very helpful:

- **The menu.** The menu was acceptable for the novice working on one serial process at a time. However, after the user had mastered the system, menus became bothersome.
- **The command-driven interface.** The command-driven interface is often preferred by technically sophisticated users who know exactly what they want to do and do not want to be slowed down by anything.
- **The window-based graphical model.** Developers of next-generation applications consider the window-based user interface to be the replacement for both the menu and the command interface. However, this technology is too simplistic to meet the needs of most users. Basically, this model emulates a desktop, but in a two-dimensional manner. Users need depth as well as length and width — information and tasks usually go down multiple levels. Furthermore, though certain aspects of the desktop are customized (icon placement, color and so on), the basic design cannot be changed.

JUDITH S. HURWITZ

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You can't be too rich, too thin or have too much storage

Andrzej Dudzinski

Storage will become more efficient and easier to manage

BY KENNETH HALLAM

Someone once said: "Programs grow to use all available storage." This axiom seems truer today than ever before. When you hear about the need to have a minimum of 6M bytes of main memory to operate OS/2 Extended Edition efficiently, you should not forget that this appetite for space extends to peripherals as well. There is a limit to all things, including storage — and how much the consumer is willing to pay for it.

The availability of information to the desktop user will continue to grow at a fantastic rate because of increased network use. To manage what will appear to the user as an unlimited amount of storage space, a more compact and efficient storage hierarchy will evolve.

All storage doesn't need to be on the desktop anymore. User data may be stored on a Winchester disk drive on a network server, in a string of Winchester drives on a mainframe, on an optical cartridge in a jukebox on a mainframe or off-line in a tape library at a different mainframe location.

Applications previously limited to large mainframes, such as economic modeling, consumer profile analyses and logic simulations, will all be available to the desktop user. New applications such as manipulation of photographic images and model visualization will be implemented because of the virtually unlimited amount of storage provided by accessing a global database.

The greatest impediment to movement in this direction has been price resistance. This reality was felt rather painfully last year by the builders of 380M-byte Winchester disk drives. They had a good product that no one was willing to pay a premium for because the technology was two or three years ahead of its time while the main memory size and software lagged. The result was a bloodbath in price competition. Inventories got out of hand, and some firms began to drop the price until the product moved, regardless of the consequences.

Users will need this kind of capacity, however, and because of Microsoft Corp. and IBM with their Windows and OS/2 products, memory size and software are catching up.

What about the future? Will users continue to grow into larger and larger capacity disk drives? Will the desktop of 1995 have an 800M-byte or 1G-byte disk drive on it? While some may want and get just that kind of system, it is more likely that as the need for storage continues to grow, the architecture of the storage system will evolve as well.

Network acceptance

Already, networks are becoming the norm, rather than the exception, for the corporate desktop user. The concept of shared resources — which once frightened users with the specter of a centralized, unresponsive, uncaring data center — is now gaining widespread acceptance. The network file server has become an accepted form of storage that the desktop user is willing to consider as part of his resources.

As the need for storage grows because of increasingly complex operating and applications software, so will user demand for access to more and more information. This is where the greatest increase in storage capacity will be felt — in the need to access vast amounts of information by an ever-widening class of users.

The architecture to support this need must consist of a hierarchy of storage devices and locations. At the desktop level, the local Winchester drive has already been augmented by other storage devices, usually with removable media. One quarter-inch tapes and compact disc/read-only memory (CD-ROM) drives are now available on a number of systems. Other forms of optical storage are beginning to appear.

On the market today are 5¼-in. form-factor optical drives with capacities of 320M to 500M bytes or more per side. Already, advertisements in the trade press are touting 3½-in. form-factor optical drives with a capacity of 128M bytes on a single-sided disc.

The advantage these optical drives offer is that they are removable and rewritable. Thus, a user with a single drive has access to a virtually unlimited amount of information that may be sitting on a shelf near the system. Suppliers of complex software or large database information systems can reproduce the 3½-in. optical disc at low cost with a portion of the media dedicated to read-only storage.

Although the cartridge and disk combination will cost in the neighborhood of $10 to $15 in large OEM quantities, the real advantage will be in time saved. Not every copy has to be written in a drive with the software or data. Each disk will be stamped out at the factory with the data impressed on it.

The storage hierarchy will consist of 4M to 6M bytes of main memory, local fast Winchester disk drives with 200M- to 300M-byte capacity, local removable optical storage with 600M bytes per disk (slower than Winchester drives) and access to a network with a variety of storage options.

The network can offer access to large-capacity Winchester drives (1G to 2G bytes each), optical storage jukeboxes with capacities of several terabytes and tape drives for archival storage in unlimited amounts off-line.

The user will need to think more carefully about how frequently he will use the stored data. Some companies may even have a storage manager who will make decisions about the class of storage for specific data. Others will simply let the cost of the storage provide the incentive to users to keep moving their data to the lowest and cheapest level possible.

Storage story

Mass storage prices for Winchester drives have declined during the last 20 years, while capacity has increased

Date	Capacity	OEM price	Price per 1M byte
1970	40M bytes	$10,000	$250
1975	80M bytes	$6,000	$75
1980	200M bytes	$7,000	$35
1985	20M bytes*	$400	$20
1990	100M bytes*	$500	$5

*Denotes PC desktop drive

Source: ENDL Associates

CW Chart: Paul Mock

The big change in desktop computing brought about by optical storage will be the availability of large amounts of information locally to the user as well as the addition of a new class of storage to the network. Random-access memory, which is not yet as fast as a Winchester drive but has the ability to store vast amounts of data in an automated library, has led many to describe optical storage as "near-line" storage. This means that while the data may not be connected directly to the system at all times, it can become available within a few seconds, if needed.

Standard comments

The critical feature of this class of storage is its removability, which has brought the issue of storage standards to the forefront.

Standards will influence the growth of storage on desktop systems. IBM recently adopted the small computer systems interface (SCSI) for some new models of the Personal System/2, joining the list of 100 companies endorsing the interface as a standard for optical drives.

This is good news for the consumer because it encourages an open environment in which a large number of firms offer products that will attach to the SCSI port. A common interface lowers costs for the manufacturer and consumer. With standards, plug and play becomes a real possibility. Peripherals can be quickly added into the system, and less change needs to be made to software to control it. The SCSI is already supported by over 100 companies with a huge variety of devices and has become the standard for all optical drives.

The trouble with DAT

Depending on whom you talk to, digital audio tape (DAT) is either the next peripheral to take the desktop computer market by storm or the most overhyped minor player in the league.

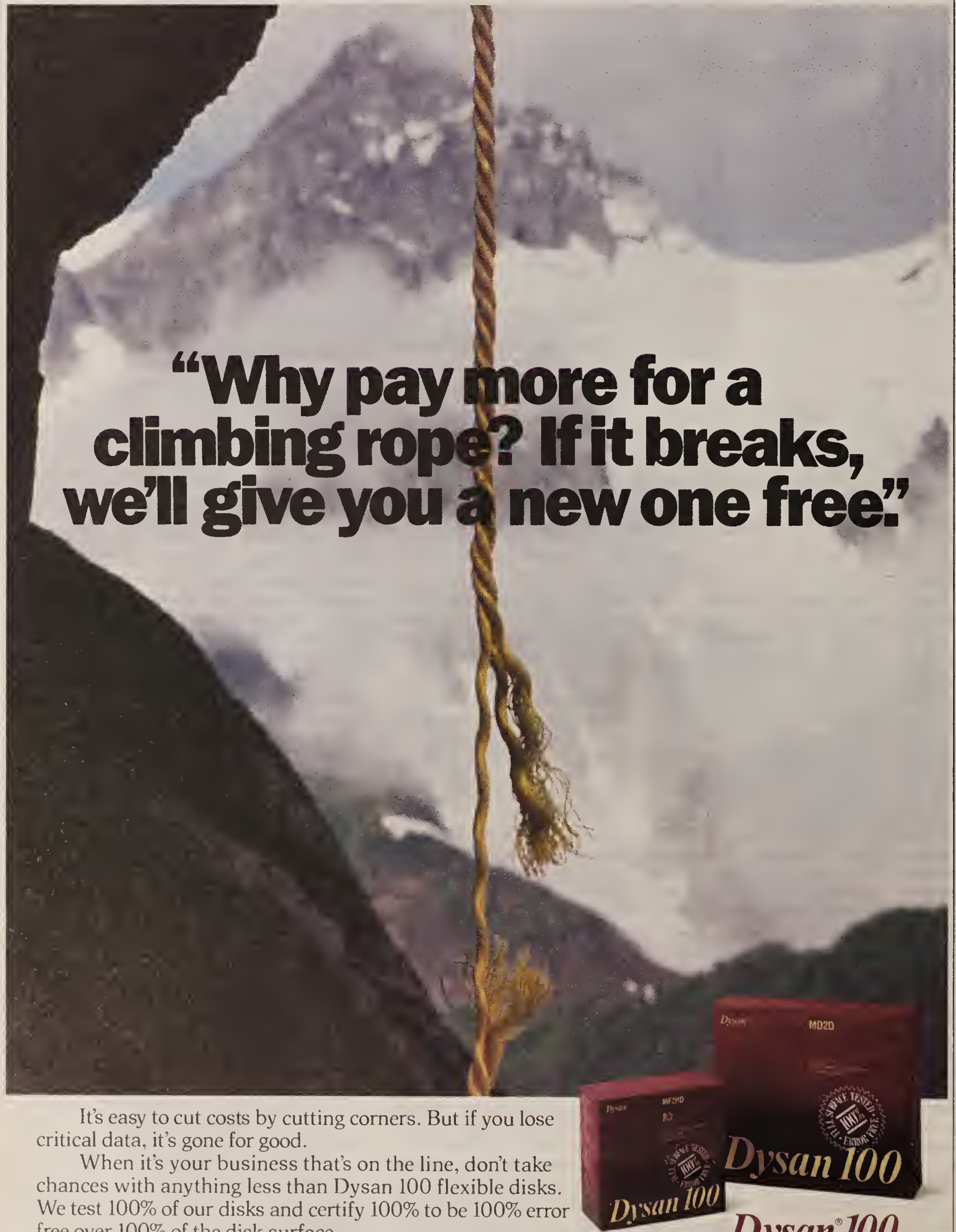
This peripheral is a spin-off of the popular music compact disc. Even though the CD has virtually replaced the vinyl record in the home audio market, it took several years before there was any significant number of compact disc/read-only memory drives seen on desktop computers.

This situation is not good for the price of DAT drives. Until DAT reaches some level of popularity among consumers, the price of the computer version will be constrained. Also, DAT's serial nature (slow access) and slow data transfer rate (about 180K bit/sec.) make it closer to a floppy than a Winchester drive in terms of speed.

As most professionals are already well aware, there is far too much information available within a field for one person to scan it all every week. To avoid an ever-increasing mountain of paperwork, the bulk of this information will be accessed via networks and information utilities.

The office of the future will become part of the global information network. Information will flow in all directions over the network, and storage will cease to be a limitation in the work environment. •

Kenneth Hallam *is a partner at ENDL Associates, a market research firm located in San Juan Capistrano, Calif., that specializes in storage issues.*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Andrzej Dudzinski

As data sharing becomes crucial, OS/2 and Unix vie for network favor

Watching LAN computing come into its own

BY DAVID RUBIN

In the next few years, companies will need to work smarter to keep up with the competition.

A significant enabler for this will be local-area network-based computing — a networked information technology architecture based on intensive use of personal computers, client/server computing, cooperative processing and distributed databases.

Unlike Open Systems Interconnect (OSI) networking and broadband Integrated Services Digital Network (ISDN), which are longer term issues, LAN-based computing is poised to catch on in the early and middle years of the decade. Information systems people will be challenged to navigate the politics and technology of marrying this approach to conventional computing and creating enterprisewide networks.

The LAN-based architecture integrates processing with local- and wide-area networks. It promises low costs and high performance — cooperative computing and transparent access to consistent databases, for example — and supplies enterprisewide networking as well.

Networks of microprocessor-based computers hold the potential to deliver the same performance as machines with much bigger price tags. Miniature mainframe servers running Intel Corp. 80386 and I486 processors that cost between $22,000 and $45,000 are now becoming competitive in performance with a $200,000 VAX from Digital Equipment Corp. or a $2 million IBM mainframe.

Many vendors, including IBM, are integrating OSI standards into their proprietary systems to support some degree of multivendor communications.

The next generation of PC applications will drive the major investments in computing and communications. This generation will run on OS/2 and perhaps Microsoft Corp.'s Windows. To the degree the applications foster acceptance of OS/2 Extended Edition, they will stimulate LAN-based computing.

OS/2 may become an "incubator" of new high value-added applications, which could prompt purchases of expensive PCs and workstations. If this scenario unfolds, OS/2 would spur rapid growth of both Systems Application Architecture (SAA) and Unix networks.

However, OS/2 is not perfect. The shortcomings of OS/2 Version 1.2 are that it is 16-bit, has limited support for DOS applications and lacks demand paging and adequate device drivers. These shortcomings will be corrected with OS/2 Version 2.0, which is expected sometime in 1991.

Unix networking, which allows open LAN-based computing, is favored overseas and by the scientific, engineering, university and government communities in the U.S. These users are drawn by Unix's ability to run applications from different vendors, support for distributed client/server applications and price/performance benefits.

Unix dominates the workstation market and will continue to do so until 32-bit OS/2 is available sometime after 1991. Unix is a mature, multitasking, multiuser operating system with a large applications base. Unlike OS/2, Unix can run on a wide variety of processors.

Support for X-terminals — a cost-effective substitute for workstations — is another advantage of networked Unix that is unavailable with OS/2. They provide large screens with windows as well as high-resolution, bit-mapped graphics at a cost of only $2,000 to $3,000 — far less than the $7,000 to $20,000 cost of a workstation.

The shortcomings of Unix are poor positioning for mass-market distribution and a lack of PC applications. The base of Unix users and the different types of code involved mean that it cannot support the distribution of shrink-wrapped software through retail stores. Providing the ability to run applications on different kinds of computers increases the costs of software development and service and complicates distribution. Making matters worse are the two chief versions of Unix and several graphical user interfaces. These problems have slowed acceptance outside of specialized applications.

The LAN plan

The following are tips for implementing local-area-network-based computing:
- Balance top-down planning of data architecture with bottom-up support for user-driven applications and new technologies.
- Preserve the flexibility of users to select the best technology while providing enterprisewide connectivity.
- Balance new technology with backward compatibility.
- Balance multivendor networking with proprietary networks.
- Include a practical approach to network management.

Migration barriers

Acceptance of LAN-based computing will hinge on reactions to four impediments that stand in the way of migration to OS/2 or Unix: DOS life extensions, high costs, a lack of applications and barriers to open systems.

- **DOS life extensions.** DOS is not supported by SAA, but it is adequate for many users. With clever circumventions of its limits, DOS will continue to be useful even to users who want multitasking, more memory and graphical interfaces. The multitasking provided by OS/2 has been partially simulated under DOS through Windows. Windows 3.0, which runs under DOS, will tap the protected modes on 286- and 386-based machines, providing up to 16M bytes of random-access memory. It has graphical capabilities that, for many purposes, rival those of OS/2 Presentation Manager and the Apple Computer, Inc. Macintosh — but at a lower cost.
- **High costs.** LAN-based computing is expensive. Windows will require 2M bytes of memory. In contrast, Presentation Manager requires 4M bytes, and Officevision calls for 8M bytes. An 8M-byte IBM Personal System/2 costs $7,300 or more. Unix workstations also cost as much or more.
- **Lack of applications.** The expense of upgrading from DOS requires solid justification. However, many DOS applications have been ported to OS/2 or Unix with little in the way of added capabilities. Users report higher productivity with OS/2 applications, and some companies seem to be hotbeds of OS/2 support, but hot new applications are lacking. As a result, demand for expensive PCs has been sluggish. Attractive new OS/2 applications may appear after 1991 with the arrival of 32-bit OS/2.
- **Barriers to open systems.** There is a lot of appeal to the chief idea behind open systems — avoiding dependency on vendors. Realizing this goal, however, is not as simple as buying a standard operating system. The additional requirements include database standards, application programming interfaces, communications interoperability and administration across operating systems.

Barriers to open systems are formidable, but they will gradually fall.

OS/2 has the edge

Despite the greater technical virtuosity of Unix, the market will favor OS/2 in the long run. In the next five years, there will be considerable progress in LAN-based computing, even if new OS/2 applications do not materialize. However, this progress will be far more fragmented than it would be if new applications appear.

There's reason to be optimistic about new PC programs. Five years from now, we should see 32-bit OS/2 applications in areas such as the coordination of work among departments, groupware, imaging, integrated voice/data conferencing and access to varied databases for tasks such as customer service.

The delay in bringing 32-bit OS/2 to market will help establish Unix on the desktop, but a lag in Unix PC applications will persist and hold back the operating system. Unix networks are useful for organizations that need low-cost terminals and for others that need high-performance workstations, such as manufacturers and securities traders.

Unix networks will evolve to support OSI, but the movement will be slow.

LAN-dominated networks will link PCs and workstations, connecting them to enterprisewide networks using bridge- and router-based LAN internet architectures. Bridges and routers are being equipped with T1 and T3 interfaces to support these architectures. For intensive communications, WANs will support high-bandwidth applications such as computer-aided design and manufacturing, imaging and video.

After 1995, advanced users will have a hierarchy of internets consisting of building LANs, campus LANs, metropolitan-area networks and broadband ISDN. •

David Rubin *is the president of David Rubin & Associates, a consulting company headquartered in Newton, Mass. The firm specializes in issues dealing with networked information technology and business.*

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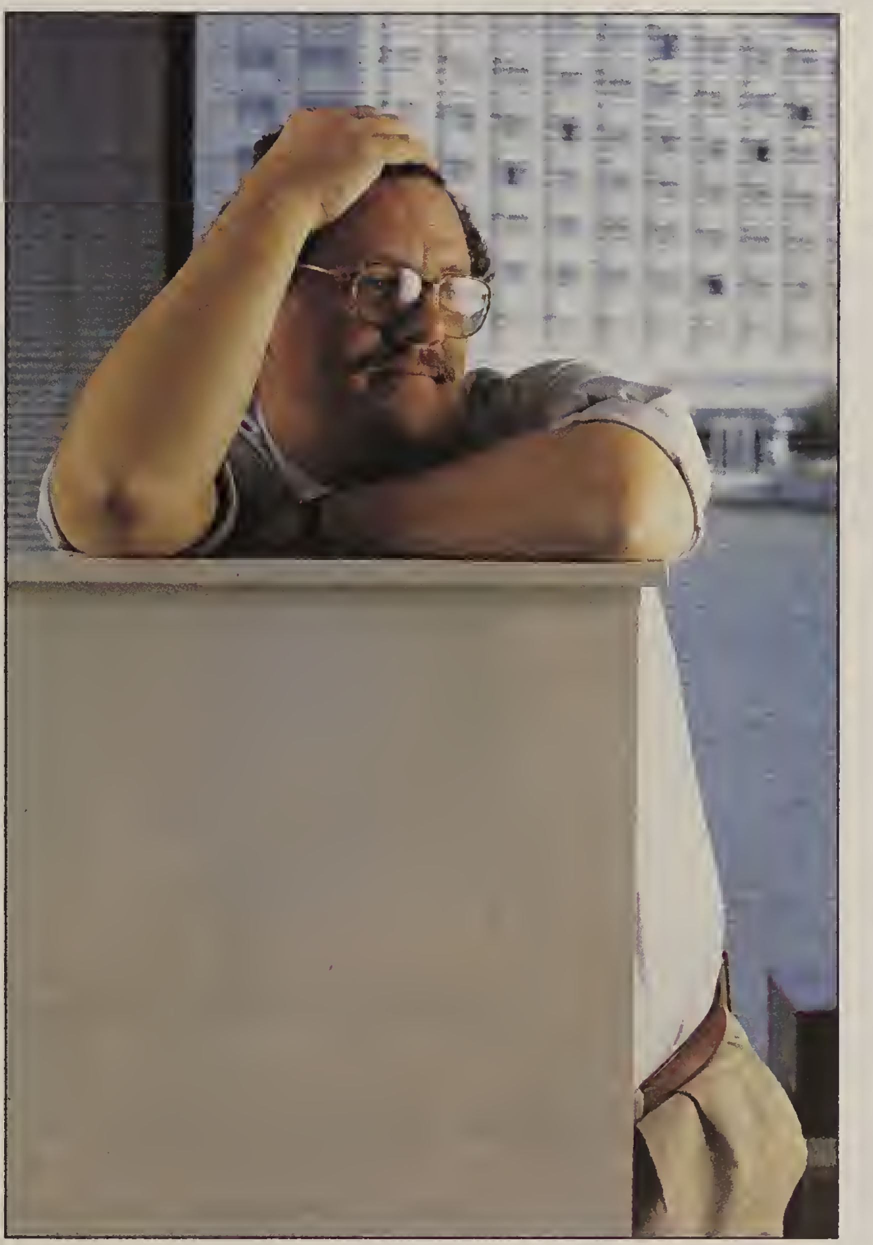
INTERVIEW

Alsop's advice to PC vendors: Worry, users unhappy

As Stewart Alsop sees it, if the personal computer vendor community doesn't get its act together and begin to apply new technologies to real-world problems, the PC industry "will begin to hurt, and it will hurt in a very real-world way." Alsop, editor and publisher of "P. C. Letter," a newsletter that follows the PC arena, spoke recently with Lory Zottola, Computerworld *Managing Editor, Special Projects, about what vendors must do to pump excitement into the world.*



Robert Holmgren

You say that there's a serious discrepancy between what users are interested in and what PC vendors are delivering. Please explain.

PC vendors are constantly being pressured from one side by changes in the technology and how it works and on the other side by customers who don't really understand the technology but want to find ways to do their work better or run their companies better.

Vendors are like a pendulum swinging between these dual and opposing pressures. Sometimes, they're paying more attention to the customer and sometimes, they're paying more attention to the technology. For the last two to three years, the pendulum has swung to the side of technology, and companies have been ignoring their customers.

In what way?

Vendors have been running around talking about issues that are fundamentally irrelevant to the customer.

Let's take open standards. The Open Software Foundation, for example, was founded on this notion that somehow there's great customer benefit from open systems. Yet, its very first offering, OSF/1, is based on an operating system that was not selected through an open process but was selected because one of the founding members forced it in — namely, IBM.

I sit back and look at this kind of thing and say: Where does the customer enter into this?

Even if you consider the process a sham, don't "open" systems offer users benefits over proprietary systems in the long run?

There is this point of view in the industry that proprietary is bad, that it is morally wrong to have a proprietary technology and that companies that have proprietary systems are evil. Yet, when you look around to see whose customers tend to be the happiest and complain less, it's those with proprietary systems. They are happy because their vendors are trying to solve their problems, not play games.

Has innovation been hurt by the existence of many competing platforms — IBM's Personal Computer, Apple Computer, Inc.'s Macintosh, the various flavors of Unix?

I don't think the various platforms have had any effect. Innovation goes beyond platforms.

For innovation to happen, you need power, self-interest, leadership and the ability to execute your ideas well.

When these conditions existed before, we've been given desktop publishing, powerful spreadsheets, powerful word processing.

Can you put the concept of leadership in the context of the PC industry?

The way I see it, leadership is fundamentally a combination of power and self-interest.

It's very hard for a start-up company to provide leadership in the PC industry because it doesn't have any power, which means market share and an awareness of the marketplace. On the other hand, the companies that have the power don't always have the motivation.

For example, even though in 1983 IBM had power in the PC business and owned a 70% share of the market, it wasn't really in its own interest to change the status quo, in other words, to innovate. That's when Apple stepped in with the Macintosh.

Has Apple lost its leadership role?

Whether Apple can introduce a revolutionary new architecture again is definitely an open question. But it's also an open question about virtually every other company in this business.

What people tend to forget about Apple is that it has created a $4.5 billion Mac business in the last five years.

The big issue for Apple is what will happen three or four years from now, when the Mac is looking old and hoary and Microsoft and the rest of them have finally got their act together, put good hardware under the hot new interfaces and put a machine together.

How is Apple preparing for that day?

Apple is doing work in the areas of digital audio, digital video and in the areas of networking and communications.

In the meantime, how much are you seeing in the way of interesting new applications for the Mac?

There was a flurry of neat applications coming out for the Mac in 1986-88, but in the last year and a half it's slowed down a lot, because Apple preannounced its System 7.0 operating system, and the industry is waiting for introductions that go along with it.

Has there been any exciting work in the DOS world in the past 12 months?

Given that you have a 640K limit, a character-based screen and all the existing conditions that go with that environment, there's no developer that's really been able to come up with anything new to do with a DOS computer for about two years, maybe three.

The last few attempts — Lotus Agenda, Semantech's Grandview — have failed. Part of the reason they've failed is because DOS users are pretty happy with what they've got; they're not really out there looking for something new.

What about OS/2?
If you want to be a real pioneer, work in this area. I've seen some development efforts in OS/2 that have led to interesting products — Aldus' Pagemaker PM is a significant product because it takes advantage of multithreading in OS/2.

Overall, then, the last year has been pretty boring?
It's been tough. The situation in the business right now is that all the major architectures are either in transition or pretty well developed. Developers are having a really hard time figuring out how to make interesting new applications that get users motivated.

Also, within the last year, there's been more focus on the politics — who's in what consortium now and why vendors are fighting — than there's been on technologies.

What kind of innovative work can we expect in the future?
I've seen software coming for the Next machine that I think is compelling; it will save Steve Jobs' buns. I can't talk about it specifically, but I can tell you it's productivity software, a new generation of core applications.

Another area that gets me excited is multimedia. It's an area that everyone takes great pleasure in saying, "Oh, ho, ho, multimedia, that's Apple's latest marketing gimmick. It doesn't mean anything." But I'm beginning to see multimedia offerings, usually using videodisc but also using CD-ROM, on the Mac.

With the advent of all these whizbang technologies, shouldn't users be moving more quickly to get rid of their 10-year-old operating systems?
The picture that most people have had over the last two years is that DOS and the Mac were obsolete operating systems so we will all have to move on to new high-power operating systems like OS/2 and Unix that can really do memory protection, be connective and do background processing. I'm beginning to think that maybe that's the wrong scenario.

The agenda has to be redefined for operating system development. What we really need is simple operating systems surrounded by a package of goodies — more sophisticated graphical interfaces and better imaging models — that will excite the user.

What's wrong with OS/2?
I could say it doesn't operate in 32-bit mode, the graphical interface stinks or this or that. But fundamentally, the problem is that it's the wrong design for a PC operating system.

Let me tell you about my first experience with OS/2. When I first installed OS/2 1.1, it stuck a bunch of files in the root directory of my hard disk with odd names. I had no idea what they were. The manual didn't tell me about them. They just appeared. I didn't know if I could move them. I didn't know what I could do with them. I thought, I'm the user; I'm supposed to be in control, and here I am, not even knowing what these files are.

What's wrong with OS/2 is that it's too difficult for the average user to understand.

What does the future hold for graphical interfaces for Unix?
To deal with Unix, you've got to go back to the leadership issue. You need companies that have power and believe it's in their own best interest to make Unix easy to use.

Clearly, Next believes that's part of its role and performs development work in this area. Unfortunately, the company doesn't license it to anybody.

Beyond that, the only organization I can see that has the self-interest as well as the size and ability to implement its vision is Sun Microsystems. It's been doing work with Open Look that a lot of people have ignored because of OSF's Motif, but in fact, Open Look is pretty close to being as good as Windows.

I've also heard AT&T talking occasionally about a personal version of Unix, in which it will strip out a lot of the utilities to make a small, more flexible version of Unix. But it's only been talk so far.

What do you think will be the outcome of the LAN Manager/Netware debate?
I think that both companies are working off the wrong model of what a network operating system should be.

The experience that I've had seeing people on existing Netware and LAN Manager networks is that they just barely understand what's going on. If somebody sets up the right path names to get the users' output to the printer and has set up network modems correctly, they can use the network. But they have no idea what's going on.

Users gain no real value out of a technology unless they have some personal involvement with it, some personal belief they can get something out of it.

Microsoft or Novell or Banyan or someone must realize that the problem is not just setting up the network but actually making users part of what's going on.

What piece of advice would you give PC vendors that hope to be around in 1995?
It sounds oversimplified, but worry about the customer. That IBM is a $60 billion company is fundamentally a reflection of the fact that no matter who's been running the company or what technologies are available, IBM has been focused on the larger opportunity of serving its customers. •

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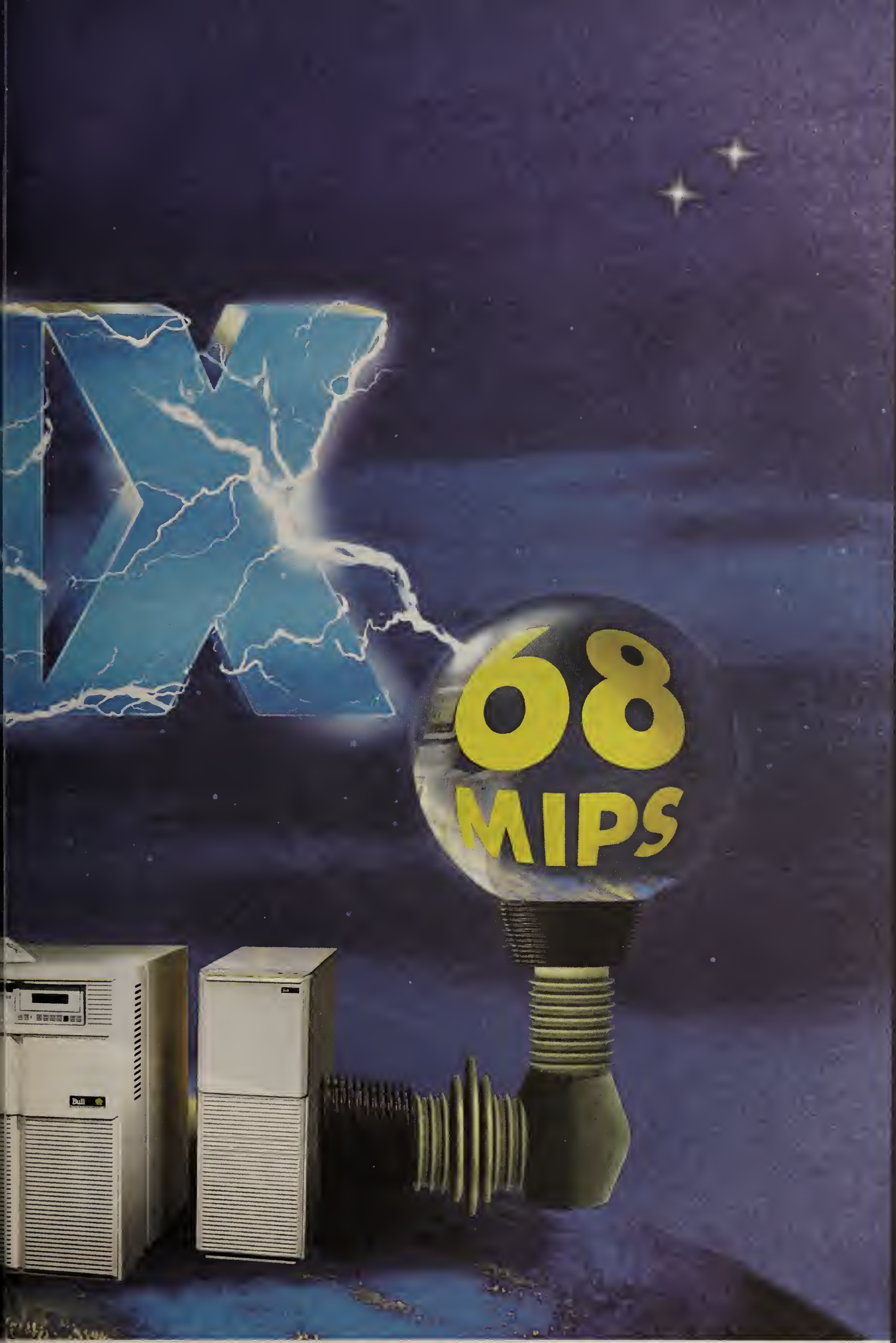

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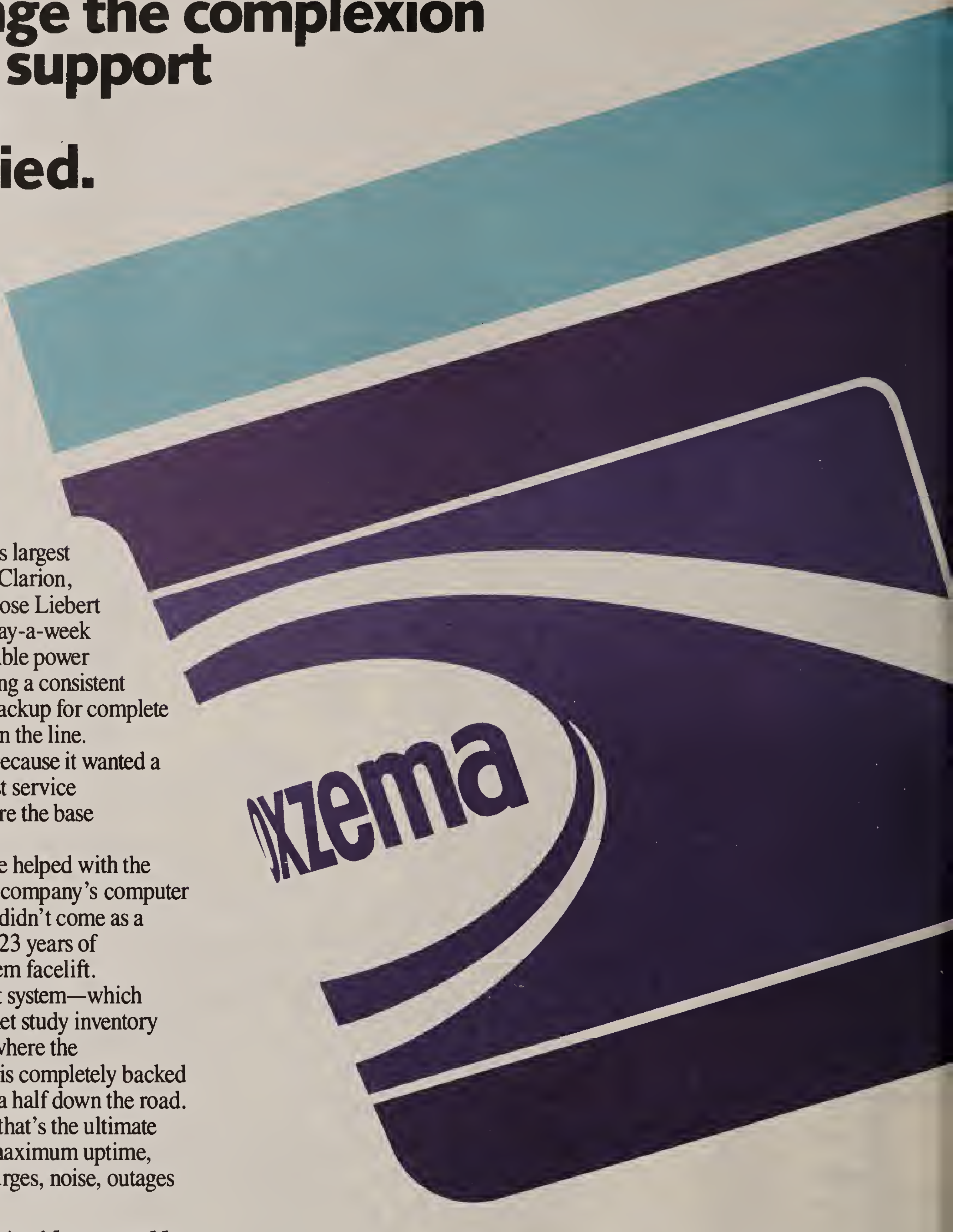

Liebert was the most attractive.

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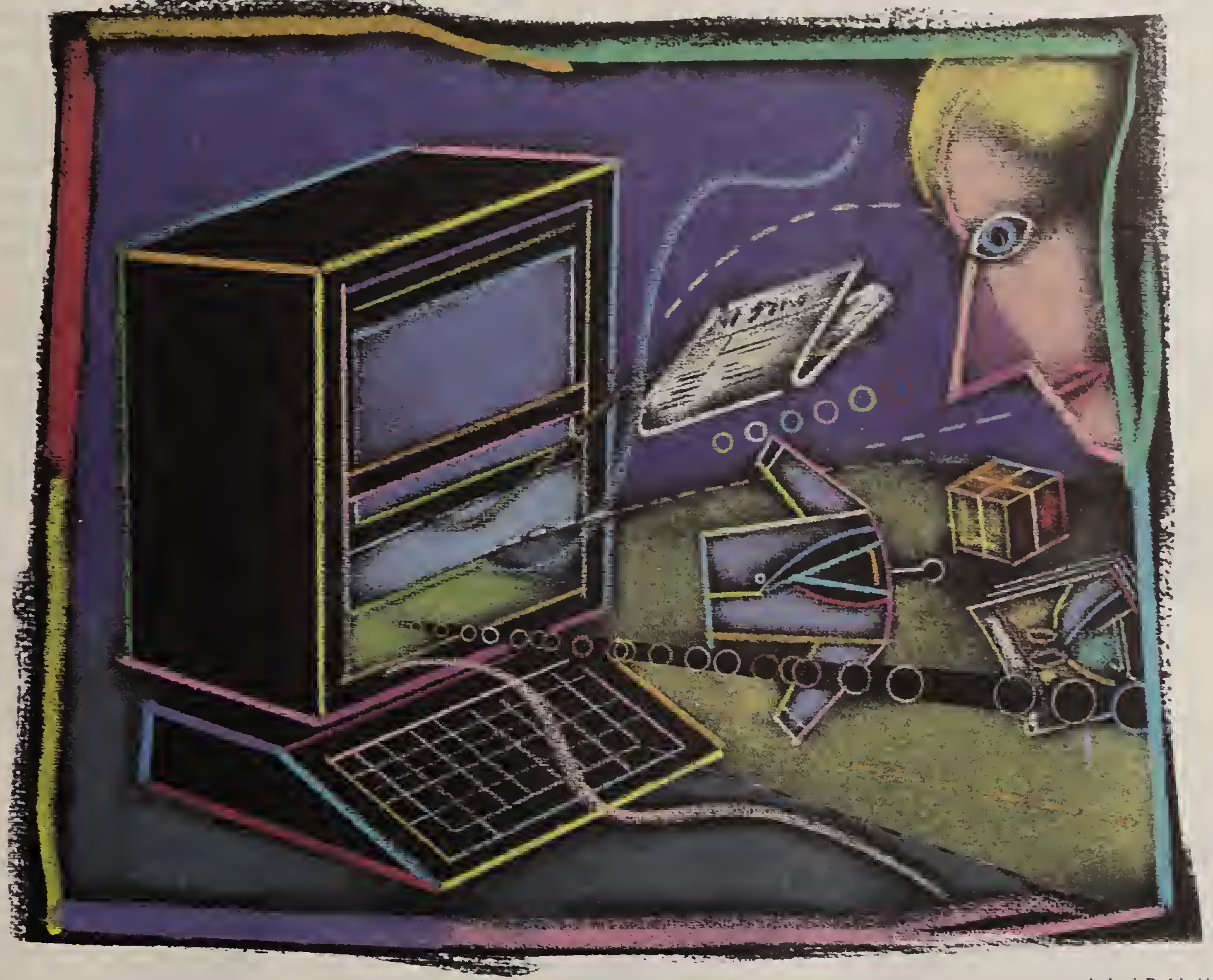


Andrzej Dudzinski

Customers take control of on-line services' future

User-defined and controlled on-line services have better chance of lasting

BY WILLIAM DUNN

History has shown it takes 20 years or more for society to adapt to new technology, according to Paul Saffo, a research fellow at the Institute for the Future in Menlo Park, Calif. The Dow Jones News/Retrieval service is about 15 years old, and 1995 will complete the 20-year period following the introduction of this on-line service. How will on-line services fare during the next five years?

On-line services are in a period of transition in which the customer is taking control. The money he spends will determine how vendors translate technical feasibility into commercial viability. Outlining what the customer has indicated he wants — and is willing to pay for — can suggest the direction the business should take.

In terms of content, early customers focused on financial information. Today's customers, who are marketing and selling in a competitive climate, are looking for market data, census figures, psychographics and information for advertising and public relations.

These customers also want the following:

- More global information on companies, finance and politics.
- Developments and trends by industry and other niches.
- Full texts as well as indexes and abstracts.

Customers say they want almost everything on-line.

In the technological realm, customers know what problems they're trying to deal with, but it's hard for them to articulate just what services they need.

Customers do know they are not pleased with hard-to-use, unintegrated and poorly organized services. They like the graphical interfaces on newer computers, but the glut of files in clustered menus means they don't remember where they put things. They prefer network services in real time — not dial-up systems.

Customers find that asking questions of parallel computers is easier and more human than conducting Boolean searches on traditional processors. Agents that help find information save users time and effort. Sound and video impart a fuller understanding of the material.

When it comes to pricing, customers want fixed charges for unlimited usage and the right to share on-line information with colleagues. They want information packaged to meet specific needs and will pay more to avoid excess. They will pay more for analysis and interpretation, information organized to their specifications and notification of significant events.

Customers place a greater value on services that tie into things they use — their corporate network, workstation or company menu. They value ease of use, of which there is currently little.

These customer requirements do not arise in a vacuum. They grow within an environment that has three prevailing forces. The first one is exponential growth of information. In the 1989 book *Information Anxiety* (Doubleday, New York), author Richard Wurman tells us the following:

- A daily issue of the *The New York Times* contains more information than the average 17th Century Englishman came across in a lifetime.
- More information has been produced in the last 30 years than in the previous 5,000 years.
- One thousand books are published every day.
- The number of newsletters just about doubled between 1984 and 1988, reaching 16,500.
- The volume of printed information doubles every eight years.

The second force is a continuing acceleration of business competition. There are stories daily about the increasingly competitive nature of business caused by global deregulation and rapidly changing technology, among other factors.

The third force is the restructuring of companies, which is making them less hierarchical and reshaping the platform for information management. Management guru Peter Drucker recently wrote that in a knowledge-based society, information is the key resource and building block for every type of organization. As knowledge workers take their place, Drucker wrote, "the ranks of middle managers will thin, workers will be more mobile, and executives must learn to manage large numbers of specialized workers, much as a conductor leads an orchestra."

A recent article in *The Wall Street Journal* illustrates this point. It reported on a small Japanese electronics company that intends to increase the number of computers for employees from 66 to 1,000. "New managers will have to be creators and innovators," a spokesman for the company says. "It is necessary to create an environment where information from both inside and outside the company can be reached easily and also shared."

The convergence of these three developments will drive efficiency in the use of information — both internal and external, current and historical. A leading accounting firm recently won a heated competition to work with a young company by finding, preparing and presenting information in three days when it might have taken two weeks.

So, where will these notions lead us over the next five years? It is not easy to tell; in the past, the outcome of major change often proved predictions wrong. It is particularly difficult to make a forecast when the forces driving implementation are shifting from the vendor's push to the customer's pull. The customer is saying he wants to know what he needs to know when he needs to know it. From the push side, vendors are still compartmentalizing everything into hardware, software, network, etc. — building component by component, company by company.

Furthermore, there is great diversity among customer requirements. Vendors must adopt, adapt and evolve within the customer's technical direction.

To peer into the future, I found I needed a new view of the information world; Dow Jones & Co. began to develop a model based more on biological evolution than technical revolution. The model recognizes increasing competition but also greater cooperation — the need for foes to work together to develop competitive standards. It also recognizes greater interdependence — the need for complex multivendor solutions to work seamlessly in the customer's eye. The fittest will continue to survive but in a more interdependent, cooperative landscape.

Companies and their customers are developing more links and becoming more interdependent to create competitive advantage; a biologist might liken the process to specialized organs connecting to serve a larger need.

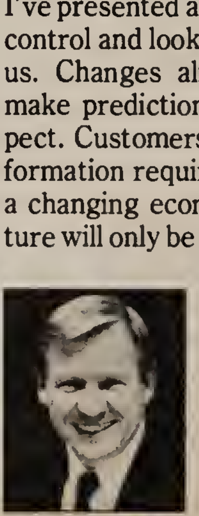
Also, clusters of people are working in a more independent and more cooperative fashion, just like cells evolve into multicell bodies to serve a specific purpose. Competitive technology providers band together to promulgate a standard for their mutual benefit, just as competition in nature operates within bounds, alongside a surprising measure of cooperation.

> VENDORS MUST adopt, adapt and evolve within the customer's technical direction.

This model became the basis of Dowvision, an on-line service from Dow Jones. Dowvision delivers news and other information to desktops through corporate computer systems. It ties in many information sources with common processing, distribution and look-and-feel. The service entails a heterogeneous, distributed architecture. It fires out news in a broadcast feed as an "eye" selects and prioritizes items according to customer profiles. Customers can reach other information and processing interactively.

Using Dowvision, a supplier absorbs the cost of collecting information. It becomes possible to store, process and distribute the information to build services customized to an individual's wants without incurring great costs — customized services for a standard cost. The price might vary according to perceived value — sometimes high, sometimes low, although how such prices will be set is not clear. The usage charge may disappear because little of anything is actually consumed. Services can shift to fixed pricing for unlimited usage and sharing of information. These notions shaped the price structure for Dowvision.

Rather than provide a detailed prediction of changes over the next five years, I've presented a model based on customer control and looked at where it might take us. Changes already under way would make predictions of specific events suspect. Customers need to evolve their information requirements as they adjust to a changing economic landscape. The picture will only be clear in 1995. •



William Dunn *is the head of the Information Services Division at Dow Jones & Co., located in Princeton, N.J. He directed the development of Dowvision.*

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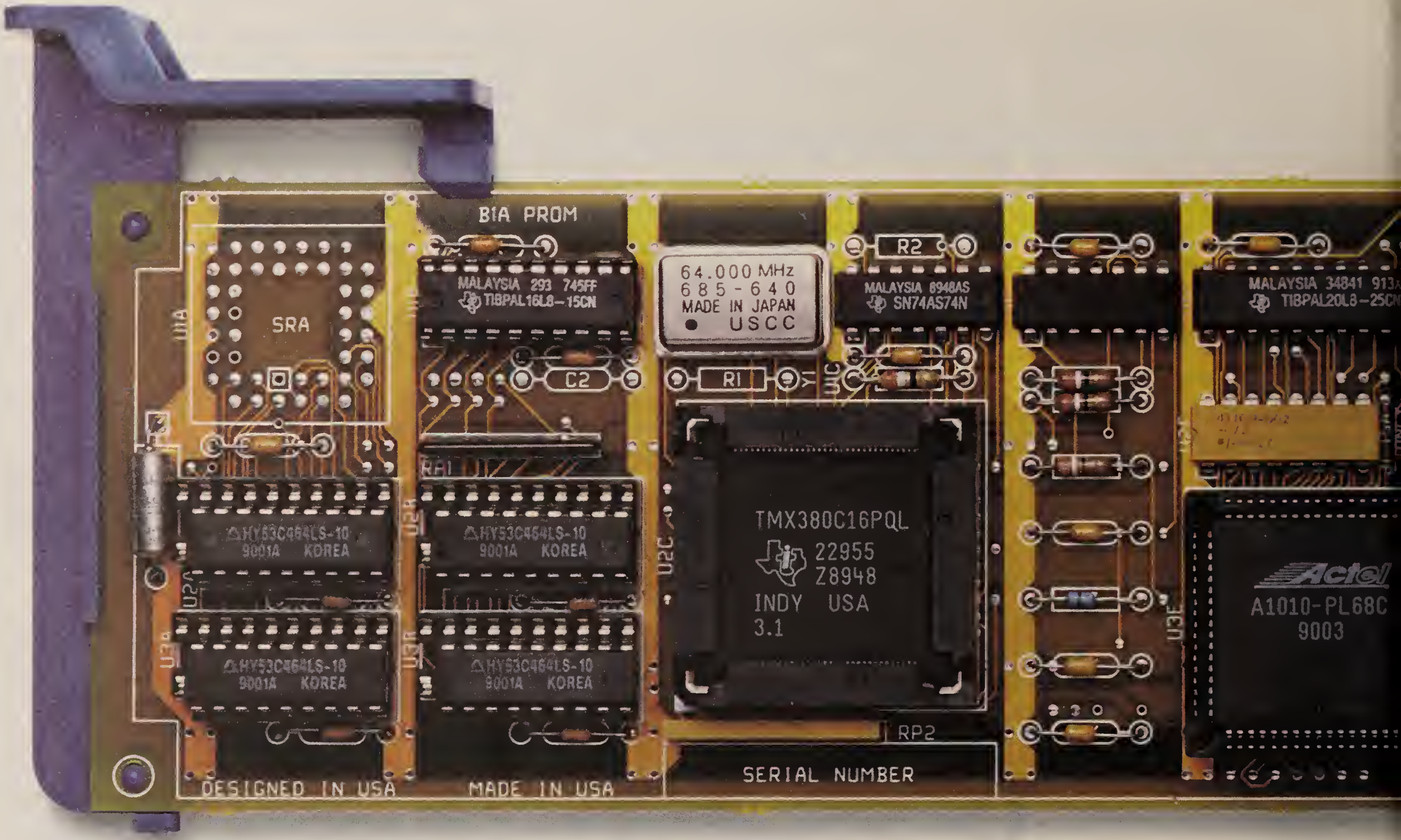

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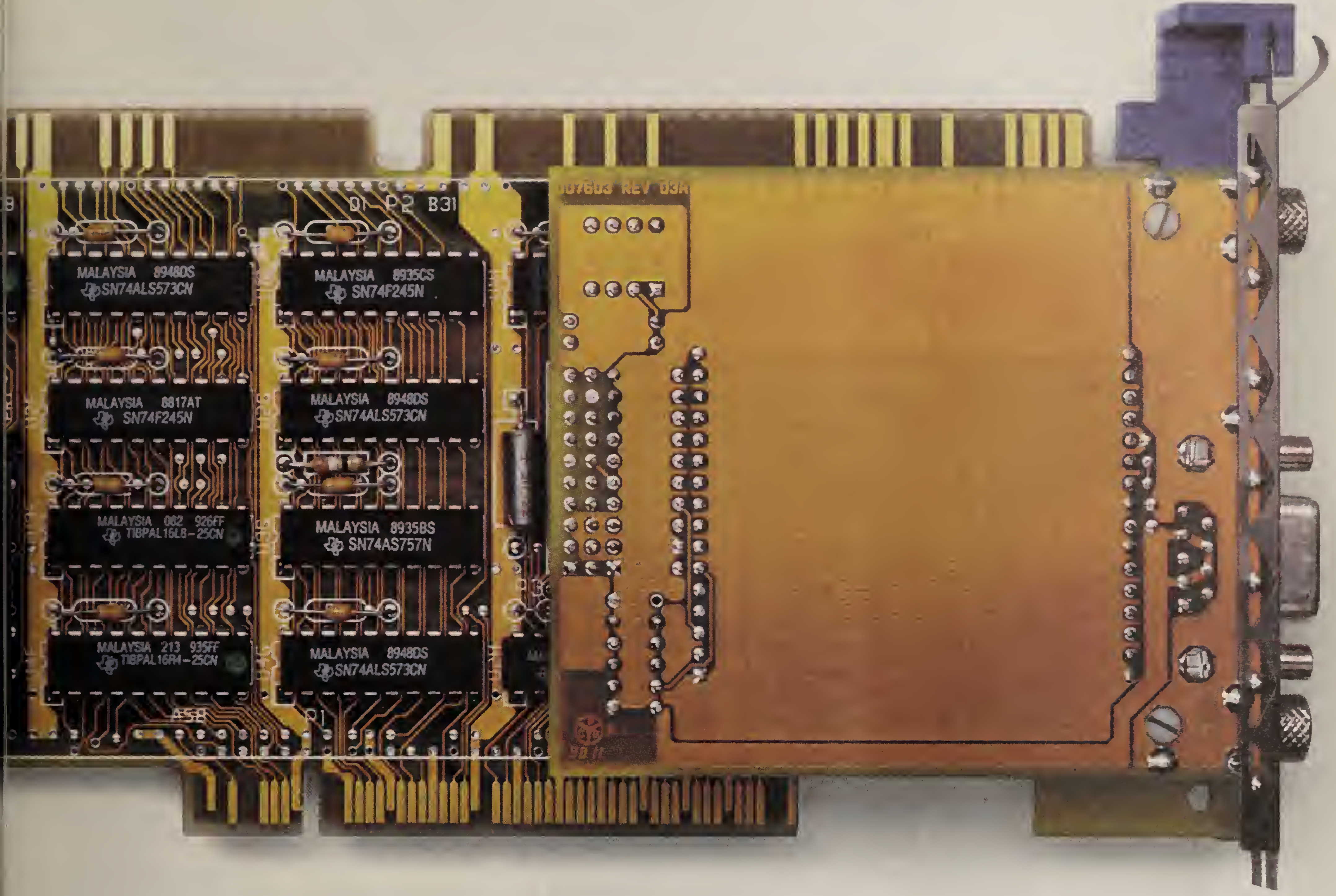

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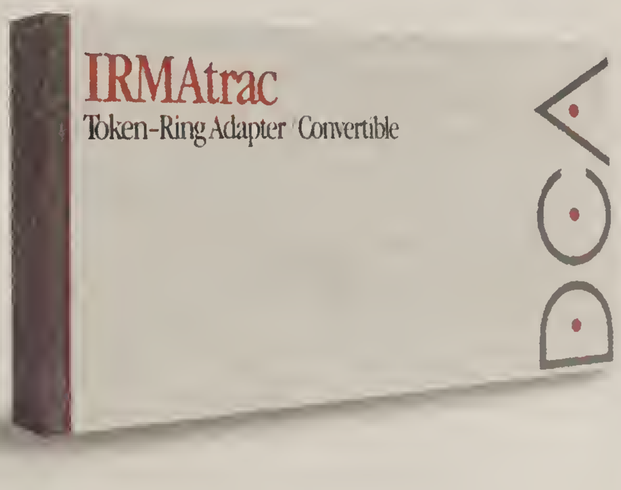

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The incredible shrinking PC

Andrzej Dudzinski

The smaller the better! A rallying cry heard 'round the world for business users in the coming decade

BY EGIL JULIUSSEN

Small is very big these days, and it is going to get much bigger. A quick comparison of the 1986 laptop specifications with today's laptop, briefcase, notebook and pocket products reveals how far we have come in just five years. It is reasonable to expect similar advances during the next five.

All this is good news for business users. Laptop technology is well suited for the working habits of most people. Laptops have given users the freedom to become more itinerant, enabling them to take their computers to their work, whether that work is at home, on a plane or in Tahiti.

Laptops are also a natural complement to jobs that are mobile by definition, with these machines becoming staples for such occupations as sales representatives.

Laptop personal computers will continue to be built with the latest technologies. While desktop PCs use older 5¼- or 3½-in. hard disks and CRT technology, for example, laptop PCs were designed with 2½- and 3½-in. hard disks and LCDs. But today's laptops do have their weaknesses when compared with desktop PCs — they lack an affordable flat color display, with most running in the $1,500 to $2,000 range.

There is hope, however; a more affordable display will be available in three to five years. The result will be that laptop PCs will start replacing some desktop PCs, primarily in settings in which space is at a premium.

Technological strides in several areas will help to establish laptops as a fixture on the business scene. Areas to watch include the following:

- **Semiconductors.** With semiconductor memory chips quadrupling in capacity about every 3½ years, 16M-bit random-access memory chips will be in production by 1995. At the same time, RAM chip prices have declined an average of 20% per year in the last 20 years, and the long-term trend has continued downward at 20% per year.

Semiconductor technology increases the performance of laptop computers by advancing the speed of microprocessors by 50% per year on average.

- **Magnetic disks.** Even though they've been around for 30 years, magnetic disks continue to advance. Currently, disks quadruple their storage capacity every four to five years while maintaining their price and size. More importantly for laptop PCs, however, new magnetic disk products are regularly introduced at lower prices and smaller sizes. Today, for example, you can get a laptop PC with a floppy disk and 3½-in. hard disk for $2,000. In 1986, $2,000 bought you a floppy-based system.

The latest product segments include 2½-in. hard disks and 2-in. floppy disks.

- **Display technologies.** LCD will remain the dominant technology for the near term. By the mid-1990s, the monochrome LCD screen is expected to double its resolution in numbers of pixels. But the biggest improvement will be the general availability of color LCD screens.

The readability of LCDs will also improve at a steady rate. Other flat display technologies such as plasma and electroluminescence will be used with laptops but primarily with high-end products because of their high price and high power consumption.

- **Input technologies.** Advances in speech recognition will allow limited but powerful special-purpose speech recognition capabilities for laptop computers. For the most part, however, the keyboard and pointing devices will remain the most common input devices for laptop PCs, and that means it is unlikely that laptops will shrink much further.
- **Handwriting recognition.** The first laptop computer to use handwriting recognition was introduced by Grid Systems Corp. late last year.

These handwriting recognizing computers, or notepad computers, are currently limited in their recognition capabilities, but the technology keeps improving.

Grid's notepad computer is primarily

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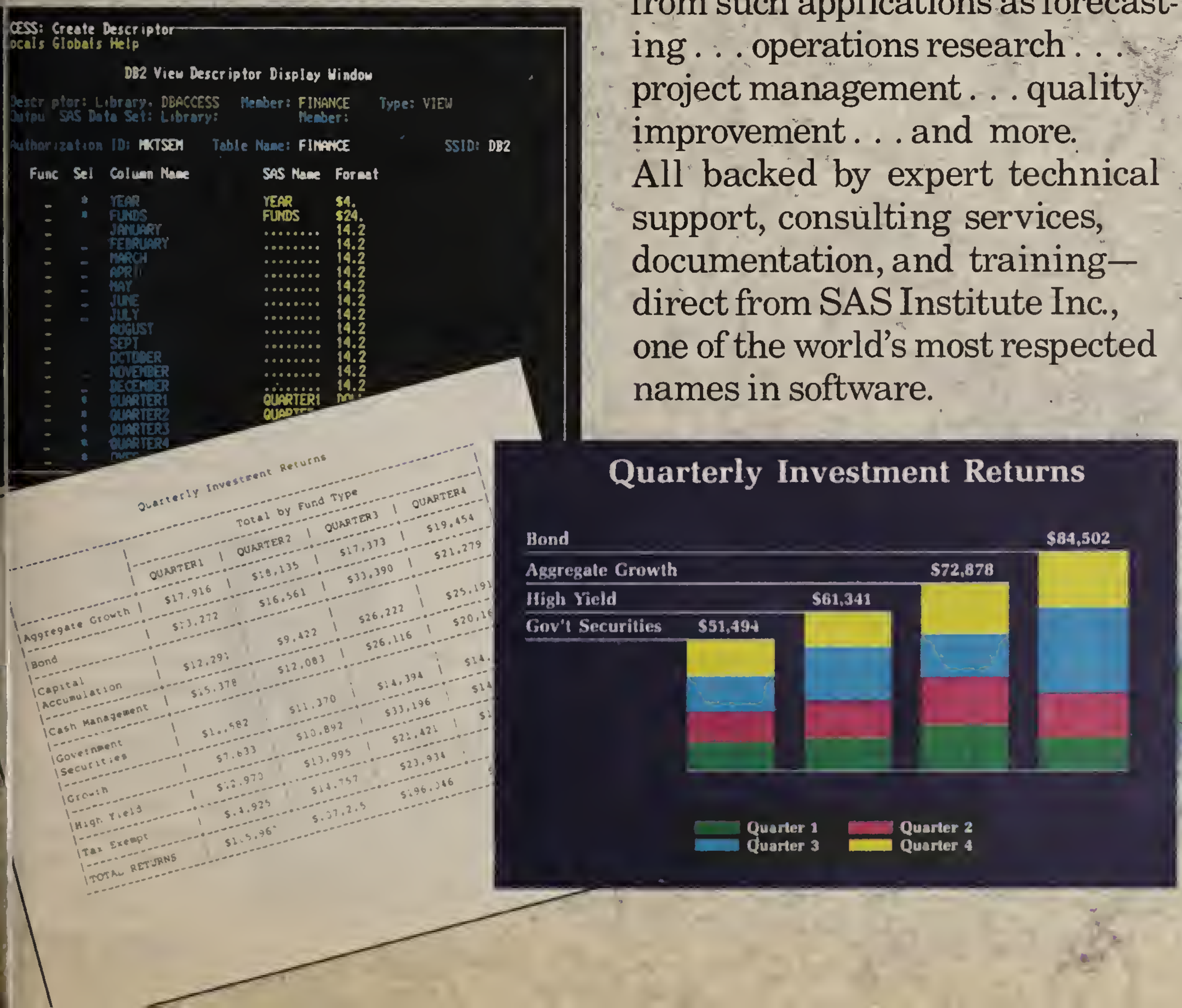

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being used for data entry applications to help such people as dockworkers, warehouse stock staff and security desk officers. As software is introduced within the next few years, notepad computers will become more general-purpose in nature and reach into the laptop realm. The handwriting recognition and input pad technology will also supplement or replace the keyboard in future laptop computers.

By 1995, there will be four categories of laptops. The categories are based on size and weight because these two factors are the main determinants of the capabilities and functionality of laptops:

• **Laptop workstations.** Laptop workstations are compatible with technical workstations and will have 100 times the power of an IBM Personal Computer XT. Such products are just starting to emerge.

Atop whose lap?

The profile of a typical laptop user is as follows:

- Is extremely mobile.
- Uses the laptop as a second machine. (Fifty percent of all laptops are second machines.)
- Uses applications similar to those found on his desktop machine: word processing, filing and database applications, as well as spreadsheets.
- Has heavy reliance on connectivity to desktop or office machines.
- Has space contraint. In the future, laptops may be used in lieu of desktop machines when space is at a premium.

These laptop workstations will use the Unix operating system and a reduced instruction set computing (RISC) microprocessor. They may also have an Intel Corp. I486 or I586 microprocessor for OS/2 compatibility. Some versions will use the Motorola, Inc. 68040 or 68050 microprocessor instead of a RISC microprocessor.

Using either the Open Software Foundation's Motif or IBM's OS/2 Presentation Manager user interfaces, a laptop workstation will weigh from 15 to 18 pounds and will be the size of a briefcase. It will have three to four expansion slots and a built-in local-area network interface.

Graphics resolution will be at least 1,024 by 768 pixels using a color display or 1,280 by 1,024 pixels with a monochrome display. Mass storage will be on a 320M- or 640M-byte hard disk and a high-density floppy disk (possibly 10M bytes). The laptop workstation will have a LAN interface and an internal 4.8K bit/sec. cellular modem. The modem will have encryption software for secure communications. The typical 1995 laptop workstation will cost approximately $8,000.

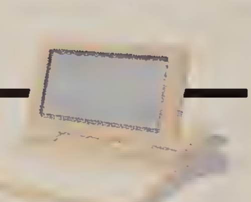
These systems will be used primarily in scientific and engineering applications and any applications that have high-calculation requirements, such as graphics-intensive uses.

• **Briefcase laptops.** This high-end PC product segment consists of laptop computers that have capabilities equal to or better than most desktop PCs. These laptop PCs weigh 12 to 15 pounds and require a separate briefcase-size carrying case.

Today, these machines use an Intel 80386SX or 80386 microprocessor. They have IBM Video Graphics Array (VGA)-compatible graphics and at least a 40M-byte hard disk. They also have a slot or two for add-in boards. Prices are typically in the $4,000 to $8,000 range. At the high end of the price spectrum, they use a plasma display. In the future, these laptop products will replace most of the luggable or transportable PCs that are AC-powered.

The 1995 version of this product segment (see chart below) will find prices coming down substantially despite tremendous increases in capability.

The processor will be an Intel I486 with 16M bytes of memory. The display will have color VGA capability and will most likely use LCD technology. If a monochrome display is used, the resolution will be 1,024 by 768 pixels. A built-in modem rated at 4.8K bit/sec. and cellular capabilities will be standard. The modem software will be able to encrypt the data for secure communications. Mass storage will consist of at least 160M bytes on a hard disk and a 3½-in. floppy disk with 2.8M bytes of storage. The weight will decrease to about 10 pounds.



You *can* take it with you

The look of portable computing in 1995

	Briefcase laptop:	Notebook laptop:
Price:	• $3,500	• $2,000
Display:	• Flat, color • Graphics coprocessor • Video graphics array	• Flat, monochrome • VGA
Processor:	• Intel I486 • 16M-byte RAM	• Intel 80386 • 8M-byte RAM
Connectivity:	• 4.8K bit/sec. cellular modem • Encryption capability	• 4.8K bit/sec. modem • Desktop PC link
Mass storage:	• 160M-byte hard disk • 3.5-in. floppy disk	• 80M-byte hard disk • 2-in. floppy disk
User interface:	• IBM Presentation Manager • Pointing device and/or handwriting pad	• IBM Presentation Manager • Pointing device
System performance:	• 50 times IBM PC XT	• 30 times IBM PC XT
Physical characteristics:	• 10 lb. • 5-hour battery	• 5 lb. • 8-hour battery

Source: Computer Industry Almanac

CW Chart: Paul Mock

The portable look in the year 2000

What will portable technology look like at the end of the decade? The technology will likely move in two directions: the dynabook computer and the headphone computer.

• **Dynabook computer.** The dynabook computer was first outlined at Xerox Corp.'s Palo Alto Research Center in the 1970s and is expected to come to fruition by the year 2000. The machine will be the size of a book and will have a high-resolution 8½- by 11-in. screen. The touch-sensitive screen covering the display is a multifunction input device; it will be used as a pointing device, a drawing pad and a handwriting recognition device.

The dynabook computer will also have proficient speech recognition and speech synthesis capabilities.

In the year 2000, the dynabook computer will have nearly 1,000 times the power of an IBM Personal Computer XT, at least 128M bytes of random-access memory and disk storage of 1G byte. Its price tag will be about $3,000.

• **Headphone computer.** By the year 2000, the pocket computer's processor will have shrunk to the size of an extra thick credit card, making the headphone machine a reality. Its output will be a speech synthesis and display projection device that can display a full-page color image in front of a user. Input technology will be based primarily on speech recognition, but it will also be possible to add a so-called virtual reality device. An example of a virtual reality device is a glove the user dons that detects pointing actions in three-dimensional applications.

The reason for calling it a headphone computer is that the display projection device and the speech I/O is put on the head like a headphone. The processor is connected to these peripherals with an optical fiber and is most likely located in a pocket or strapped to the body like a Sony Corp. Walkman cassette player.

The processing power of this headphone computer will be 150 times that of the IBM PC, and it will have 32M bytes of RAM. An external disk that fits in a breast pocket will add 160M bytes of storage. The price of the headphone computer will be about $1,500.

EGIL JULIUSSEN

• **Notebook laptops.** A few years ago, notebook PCs were primarily word processors with limited capabilities. Today, they have gone beyond that.

Notebook PCs weigh five to 10 pounds and have a footprint slightly larger than an 8½- by 11-in. sheet of paper. The notebook PC market got a boost last year when Compaq Computer Corp. introduced the LTE and LTE/286, which put last year's briefcase power into a notebook size. Currently, low-end notebook PCs use the 80C86 microprocessor, have IBM Color Graphics Adapter-compatible graphics, use two 3½-in. floppy disks and cost from $1,000 to $2,000. High-end notebook PCs use the 80C286 microprocessor, have Enhanced Graphics Adapter or VGA graphics and come with a 20M- or 40M-byte hard disk. The price ranges from $2,500 to $5,000.

The 1995 "briefcase office" will consist of a notebook laptop PC with 30 times the performance of the IBM PC XT. The processor will be an Intel 80386 with 8M bytes of memory. The display will most likely be a monochrome LCD with VGA or better resolution. Mass storage will consist of a 2- or 3½-in. floppy disk and an 80M- or 160M-byte hard disk. By the mid-1990s, a graphical user interface will be preferred by the majority of PC users. Hence, a mouse, trackball or similar input device will be included with the laptop PC.

The price of this 1995 notebook computer will be approximately $2,000. Currently, the battery life for laptop PCs with hard disk drives is two to four hours. In 1995, the battery life should be six to eight hours. The weight will be about five to six pounds.

• **Pocket computers.** Although pocket computers have been around for about five years, last year, companies announced full-function pocket computers that could use the PC-compatible software base. The pocket PC fits in a large pocket (about 4- by 9- by 4-in.) and weighs only one pound or so. The keyboard and display are cramped but are acceptable to most users.

With such a small size, however, a few compromises had to be made — primarily in the area of mass storage. There is currently no room for magnetic mass storage devices. Instead, solid-state "disks" are used. But they are not disks at all; rather, they consist of random-access memory cards that retain their contents by the use of a battery.

In some cases, these pocket PCs use read-only memory (ROM) cards to hold software or erasable ROM cards. The advantages of solid-state disks are their speed (more than 10,000 times faster than disks), low power consumption and small physical size (no drive is needed). The drawback of solid-state disks is their high price — $100 compared with $1 for diskettes — and the lack of standards among vendors. The prices of pocket computers range from $400 to $800 for a low-end product to $2,000 to $3,000 for high-end products.

The 1995 pocket PC will use a low-powered 80386SX microprocessor with 4M or 8M bytes of RAM. Pocket PCs will use an additional 4M bytes of ROM for the operating system, utilities and storage. Mass storage will consist of two or three solid-state disk slots, which will be standard by this time. The solid-state disk cards will come in a 4M-byte size and possibly in 8M bytes. They will make use of a small external battery-powered 2-in. floppy disk drive. A monochrome display with VGA resolution will be standard. The performance will be more than 20 times that of the IBM PC. The size and weight will be similar to current pocket computers. •

Egil Juliussen *is the president of Computer Industry Almanac, Inc., which produces a yearly fact book of the computer industry. He is also chairman of Storeboard, Inc., which tracks the sales of personal computer products through computer specialty stores.*

A moving story: Multimedia stakes its claim on the desktop

Andrzej Dudzinski

BY CHRISTINE HUGHES

Today, information comes to us in fragments, delivered separately through incompatible media. Until very recently, the only place it could all be synthesized was in our heads. Multimedia will change that.

Sound is broadcast via AM and FM radio waves and recorded on vinyl, magnetic tape and compact discs. Television comes to us over the air and through various videotape formats. Motion pictures can be projected in four formats — 70mm, 35mm, 16mm and 8mm film.

Professional publishers employ dozens of technologies. The personal computer delivers information to 60% of the desks in U.S. businesses using a variety of proprietary media and operating systems.

What technology can deliver us from this bedlam? Multimedia, utilizing compact disc/read-only memory (CD-ROM) technology, which permits the fusion of all media within a single delivery vehicle. CD-ROM is the catalyst that has made multimedia possible.

Introduced just five years ago, CD-ROM is already starting to change the way the world produces and delivers information. With half a million CD-ROM drives installed worldwide and the number of CD-ROM titles growing by 107% last year, the technology will continue to have a significant effect.

With CD-ROM, media forms can be digitized and transported electronically. Movies can be transferred to digital videotape or laser discs. Recorded sound can be put on laser discs. Words, graphics and pictures can also be merged as one electronic master.

Multimedia mania

It is this convergence of digitized information that is loosely called multimedia. Multimedia permits the mixing and mingling of all kinds of information — text, graphics, video, audio, animation and images — in almost endless combinations. CD-ROM is the vehicle that delivers the mix to the desktop.

As with any technological advance, it will take some time to make multimedia practical. Standards for digital moving-video compression/decompression, still-image compression/decompression and full-screen person-to-person videoconferencing are needed, as are breakthroughs in video compression and affordable and intuitive delivery systems.

Organizations need to have a strategy in place so they can apply the distributed power of multimedia to business

At this point in the technology's progression, organizations need to make sure they have a strategy in place so they can apply the distributed power of multimedia to business.

Of course, applications of a new and developing technology are impossible to foresee completely. They emerge as people experiment and learn from their experiences. However, it is both necessary and possible to make some assumptions about the future.

The following are some trends that will unfold over the next five years:

- Multimedia will become a core desktop technology. Sound and video will become part of the operating system of major desktop platforms.
- Erasable read/write magneto-optical technology and read-only partitions for personal libraries will be integrated into desktop systems.
- Application software firms will incorporate multimedia capabilities into their offerings to protect their products from obsolescence.
- International standards will emerge for both still-image and moving-video compression and decompression.
- Multimedia authoring tools will be available. Authoring tools enable users to create documents, information packets, presentations, electronic conferences and person-to-person communications without having to draw on the myriad of people required today to produce a multimedia production.
- Multimedia will extend beyond the desktop to portable presentation devices and to large, flat-screen displays and the "intelligent" television with an embedded microprocessor.

These developments will lead to a number of major changes in the way that information is collected, delivered, handled and shared.

Working productively

The most profound effect that multimedia will have on organizations in five years is in productivity. The fundamental goal of multimedia is to give organizations access to

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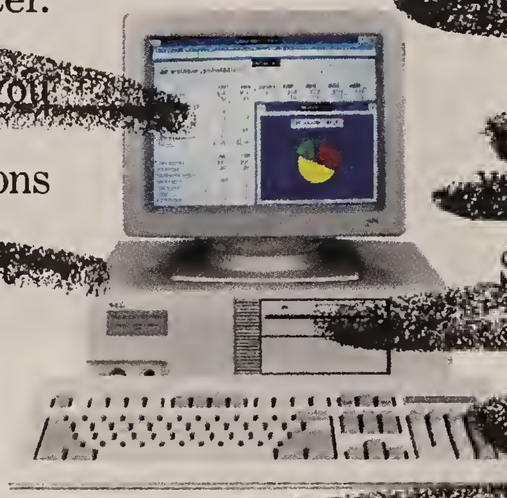

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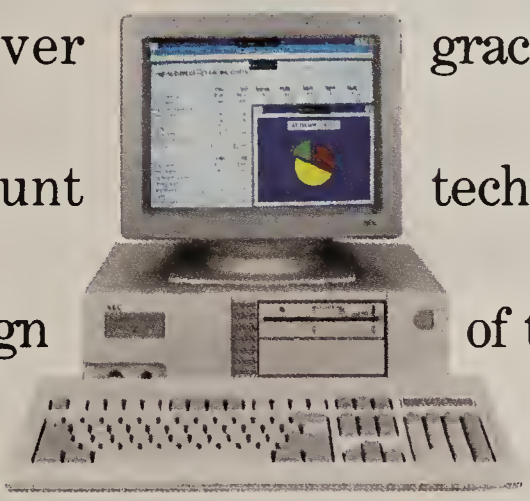

The PowerMate SX Plus

It isn't cheap, but it's one of the few computers that may be worth owning as a work of art.”

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NEC

*Manufacturer's list price. Dealer price may vary.

whatever information they need in an efficient form for the job, no matter what the source. The implementation of interactive desktop videoconferencing will underscore this most effectively.

Interactive desktop videoconferencing will be the medium by which users communicate in 1995. Workers will be able to confer on a spreadsheet from remote locations, share an electronic easel for a brainstorming session and send live, talking, full-motion reports.

They will be able to add another person to a videoconference in progress and store a full record of the meeting — in multiple languages if desired — for those who could not attend.

Presentations will also change dramatically in form. Users will be able to put together professional presentations incorporating photographs, animation, video and sound.

While the information glut that they have to wade through today will still exist, sophisticated navigation tools using a dashboard metaphor will be available by 1995 to scan and probe databases for a specific query and present the information in its optimal form.

Stretching training resources

Training is frequently viewed as a less glamorous multimedia application, but it is one that will become critical to organizations by the mid-1990s.

Most business leaders agree that corporations are facing a crisis in human capital, which is characterized by a shrinking labor pool with a declining proportion of skilled workers.

Recognizing this serious issue, companies in 1995 will deliver interactive training to a worker's desktop — not as a lesson but integrated with the work to be performed.

They will use the technology to stretch training resources, turning job experts into trainers through interactive multimedia sessions.

As multimedia capabilities evolve, the challenges to IS organizations, and to corporations in general, will be enormous.

It is impossible to tackle the delivery of multimedia to a large group without a strategy. To prepare one, companies must look at business applications for multimedia within their organization.

In addition, developing multimedia applications requires authoring skills — the ability to fuse art, film and broadcasting elements to find solutions to business problems.

One old attribute — pragmatism — should by no means be forgotten in this pursuit, however. Overestimating multimedia's potential in the near term will only serve to diminish its benefits in the long term. •

Christine Hughes *is president of Myriad Research, a Coral Gables, Fla.-based market research and consulting firm specializing in multimedia.*

Masters of multimedia

To identify the key players in multimedia in the future, we need to look at the computer, communications and entertainment industries.

It appears that Apple Computer, Inc. and IBM, with the support of Microsoft Corp. and Intel Corp., will maintain a stronghold in the desktop market.

As multimedia evolves, however, Japanese firms such as NEC Corp., Fujitsu Ltd. and Canon USA, Inc. could enter the desktop market aggressively, because of their experience with multimedia hardware and software in the home arena.

In the consumer arena, Philips Telecommunications N.V. will be a major player. It is also probable that by 1995, the regional Bell operating companies will no longer be legally restrained from providing information and will offer consumer services such as electronic Yellow Pages and business services such as desktop conferencing and electronic publishing.

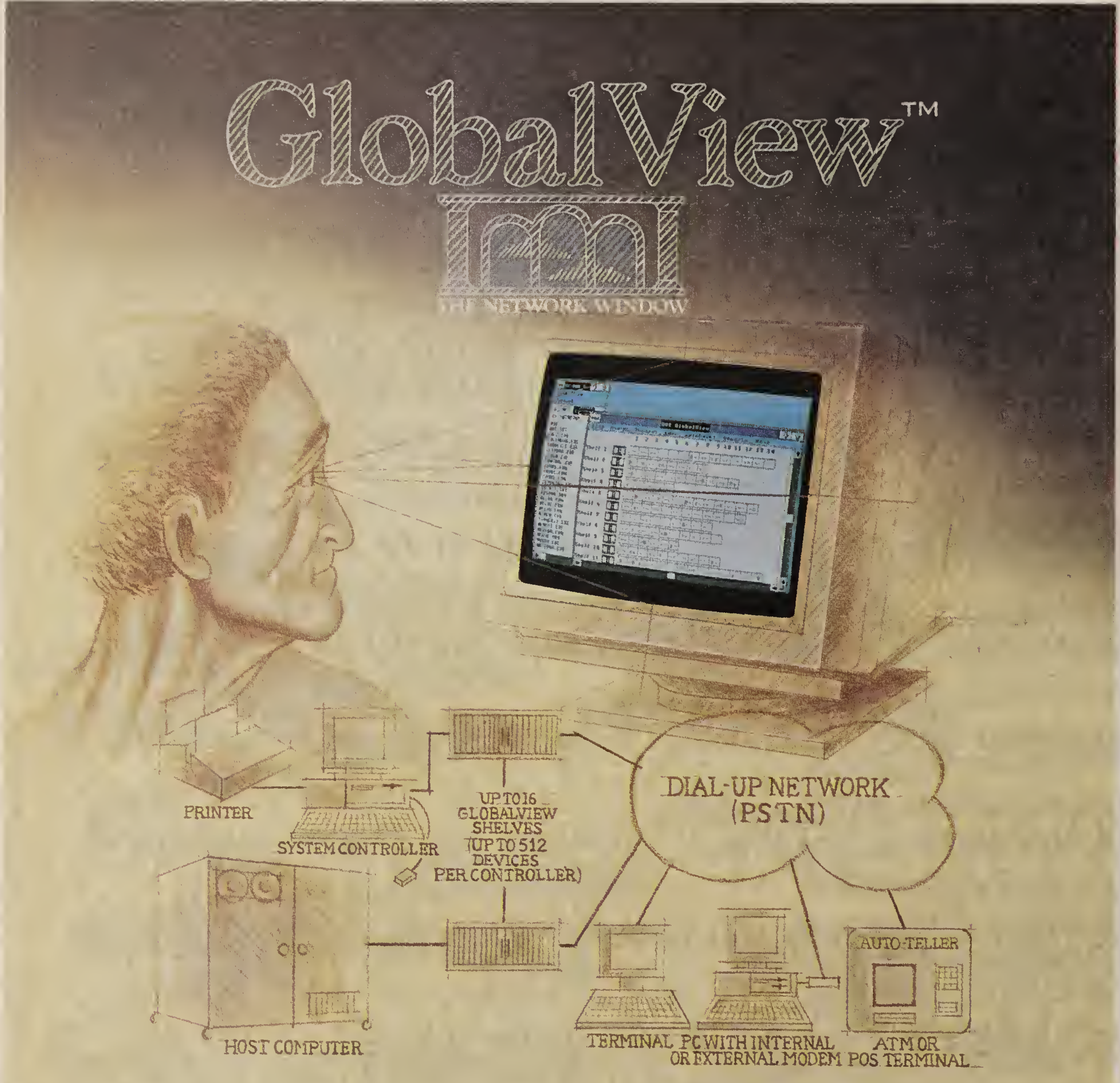
Other major vendors, such as AT&T, Northern Telecom, Inc. Hewlett-Packard Co. and Sun Microsystems, Inc., will offer distributed multimedia capabilities.

Sony Corp., with its video strength and its carefully focused acquisitions, including Columbia Pictures Entertainment, Inc. and CBS Records, is in a position to take advantage of this emerging market.

The software arena is wide open. Leading software suppliers, including Lotus Development Corp. and Aldus Corp., will pursue multimedia extensions. End-user programming tools, such as Toolbook from Asymetrix, will be a catalyst in growing multimedia-based applications.

Multimedia production software will see tremendous activity, with numerous companies introducing more functional, less expensive versions of offerings such as Macromind's Macromind Director, an authoring tool for formulating multimedia presentations.

CHRISTINE HUGHES



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Working well in a work-group environment

Networking, workstation advances will make work-group computing a viable force in the '90s

BY JOHN O. DUNKLE

Just think: A single work group of Intel Corp. based-80386 and 80486 personal computers represents a processing potential of trillions of instructions per second. This raw power, coupled with the availability of distributed applications, SQL database servers and wide-area networking capabilities, will establish work-group computing as the predominant platform for information processing and gathering in the 1990s.

Work-group computing is dramatically changing the way that people work, departments function and corporations operate. Organizations are improving worker productivity and customer service by using work-group techniques.

Take, for example, the major financial company that networked its PCs to give its staff access to multiple databases located throughout the organization. It now approves customer loans in 15 minutes. Or the insurance carrier that uses work-group technology and an imaging system to access customer policy records in 30 seconds. These are real-life examples of work-group technology working well.

Andrzej Dudzinski

Logical communication

Not all companies have achieved this level of work-group interaction — yet. Even in its most basic form, however, work-group computing offers co-workers the ability to share information and applications transparently. Broadly defined, work-group computing involves workers who are performing similar tasks and need to access the same information. Work-group technology enables people who work together to communicate logically, even if they are not physically at the same location.

Technological strides at the network and workstation levels are making this kind of sharing feasible.

During the next several years, communications and local-area network technologies will strengthen local and remote work-group communication. Today and in the future, when an office building is erected, it will typically be wired for LAN connections at each desk location.

Furthermore, many companies will purchase or lease high-bandwidth capabilities in the form of T1 or fiber-optic communications to support wide-area networking. With the price of T1 lines falling, even small companies will connect remote work groups.

By 1992, 82% of all PCs within the office environment will be networked. At this time, network operating systems and application software technology will allow users to run applications residing remotely on servers, midrange systems and mainframes.

The power of these distributed applications will mock current conventional wisdom that regards LAN technology as a vehicle only for file sharing and electronic mail.

Distributed applications not only enable multiple users to access the same information concurrently but also enable more than one system to coprocess applications, all transparent to the user. No longer will managers act on incongruous or redundant data. The use of distributed applications will enable information to play a major role in the daily management of the successful organization.

Raw power

Powerful workstations will also be an integral part of work-group computing's future. The processing power of the workstation is growing at a phenomenal rate. The pure millions of instructions per second (MIPS) within the Intel 80286-class PC is greater than the MIPS rating of the older IBM 365 mainframe — the one that used to run the government in the early 1970s.

OS/2- and Unix-based workstations will be able to sustain processing performance for applications while offering the benefits of multitasking and graphical user interfaces. These interfaces will enable the generating, viewing and editing of compound documents — information that contains both text and graphical data.

Coming onto the scene are workstations that can achieve 40-MIPS performance. These machines will likely become the processing engine for work-group applications.

No longer will work groups need to go to mainframes for such processing-intensive applications as financial modeling, numerical processing or database applications.

Work-group computing applications will be bolstered by network offerings such as Microsoft Corp.'s OS/2 LAN Manager. This system-level software service provides networked work-group users with access to applications, network peripherals,

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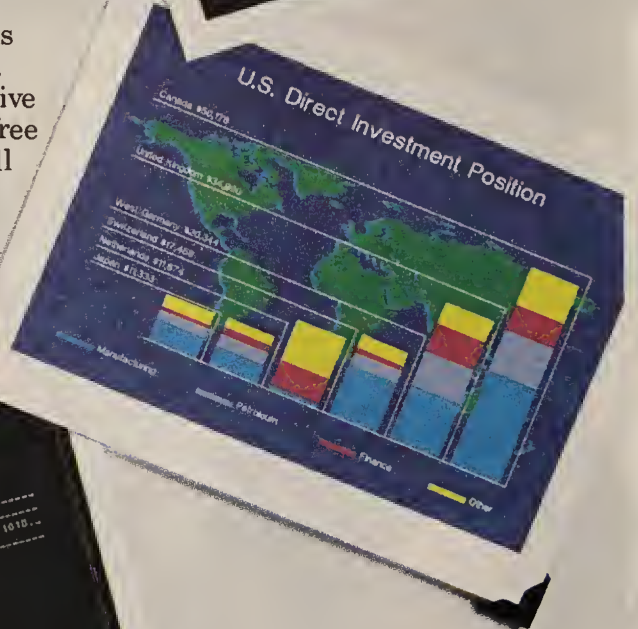

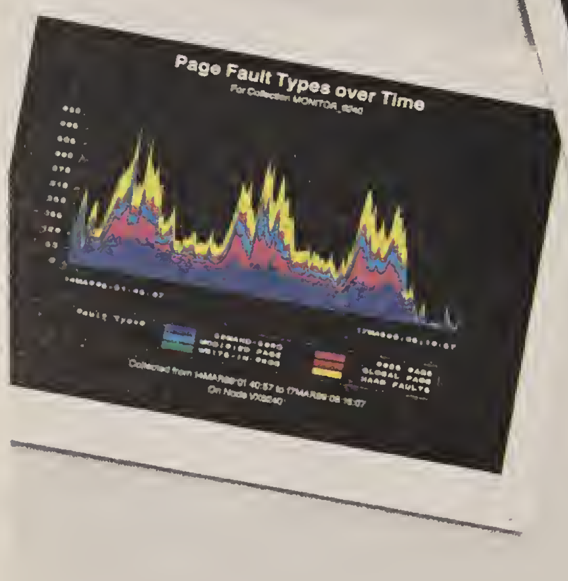

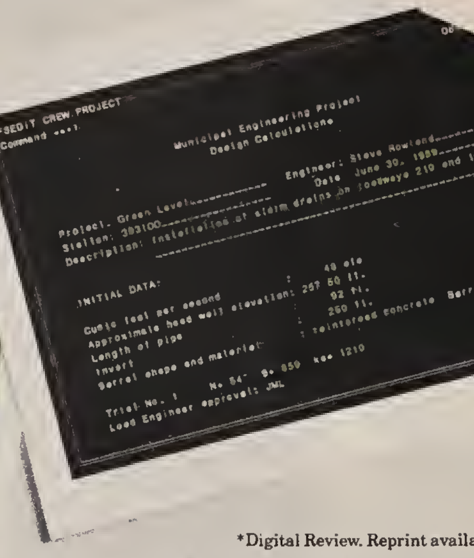

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Through the advent of server technology, work-group computing has the potential to provide interactive data exchange among the server, workstation and mainframe, with the server acting as the gateway. The server itself has processing power, thereby increasing overall network performance.

If a client on the network needs to process data that is resident on the server, the request for processing will be transparently sent to the server. The role of the work-group server is to coordinate distributed applications.

Database decade

Perhaps the most quickly evolving work-group application technology is in the area of the database. During the 1990s, databases will evolve rapidly from flat-file to relational. Remote procedure calls, which enable a user to call for a remote system to process an application, will work with SQL servers to enable individual workstations to query a mainframe database.

When this occurs, the SQL server accesses the information from the mainframe and either processes the information or passes it back to the workstation. If the mainframe's database needs to be updated with the newly processed information, the SQL server will pass the information back and update the database.

Imagine, for example, that order entry is tied to the mainframe through the SQL server. Each order has the potential to change the state of the business in real time, enabling decision-makers to act on the data immediately.

In the 1990s, graphical user interfaces will form the basis for complex data searches, printing and communicating throughout the work-group network. The complexities of the network will be hidden from the user.

For example, with AT&T's recently introduced Rhapsody system, a user can print a document by simply dragging a file or series of file icons onto a printer icon. Sending mail anywhere throughout the network is just as easy: Simply place an icon into the mailbox.

The greatest single advantage of the graphical user interface is that it allows users to interact with the *process* of computing rather than with computing itself. A top executive, for instance, will be able to monitor his business in a series of reports that can be generated on an as-needed basis.

A graphical user interface also increases the productivity of a user through standardization — menu bars and dialogue boxes are similar across a number of applications. This way, a user does not have to learn the idiosyncrasies of each application but may begin using it immediately. This reduces training time and makes the worker more efficient.

When it is made part of an organization's infrastructure, work-group computing benefits users and the business as a whole. Users get easier access to information and better personal productivity. The business realizes improvements in customer service and decision quality.

For these reasons, the competitive war of the '90s will not only be fought in the boardroom. Rather, as technology makes its way to every area of a corporation, the battle will be waged at the work-group level as well. ●

John Dunkle *is vice-president of Workgroup Technologies, Inc., a Hampton, N.H.-based consultancy specializing in work-group computing topics such as LANs, PCs, workstations and services.*

Computerworld Features Editor Joanne Kelleher and Senior Writer David Ludlum contributed to this Special Report.

No time for tradition

For enterprise computing to succeed, some long-standing traditions will have to be turned on their ears.

During the 1990s, watch for the following trends:

- Work-group computing and distributed applications, coupled with SQL database servers and high-powered personal computers, will become the platforms of choice for accessing information throughout the network. They may be better thought of as the "window into the global network."
- Midrange computers will evolve into line-of-business systems that store and retrieve enterprisewide information for a particular group. Peer-to-peer communications will enable these systems to distribute and share information throughout the organization.
- Corporate data will be maintained, stored and disseminated from the secure mainframe environment. The environment will be responsible for enterprise network management.

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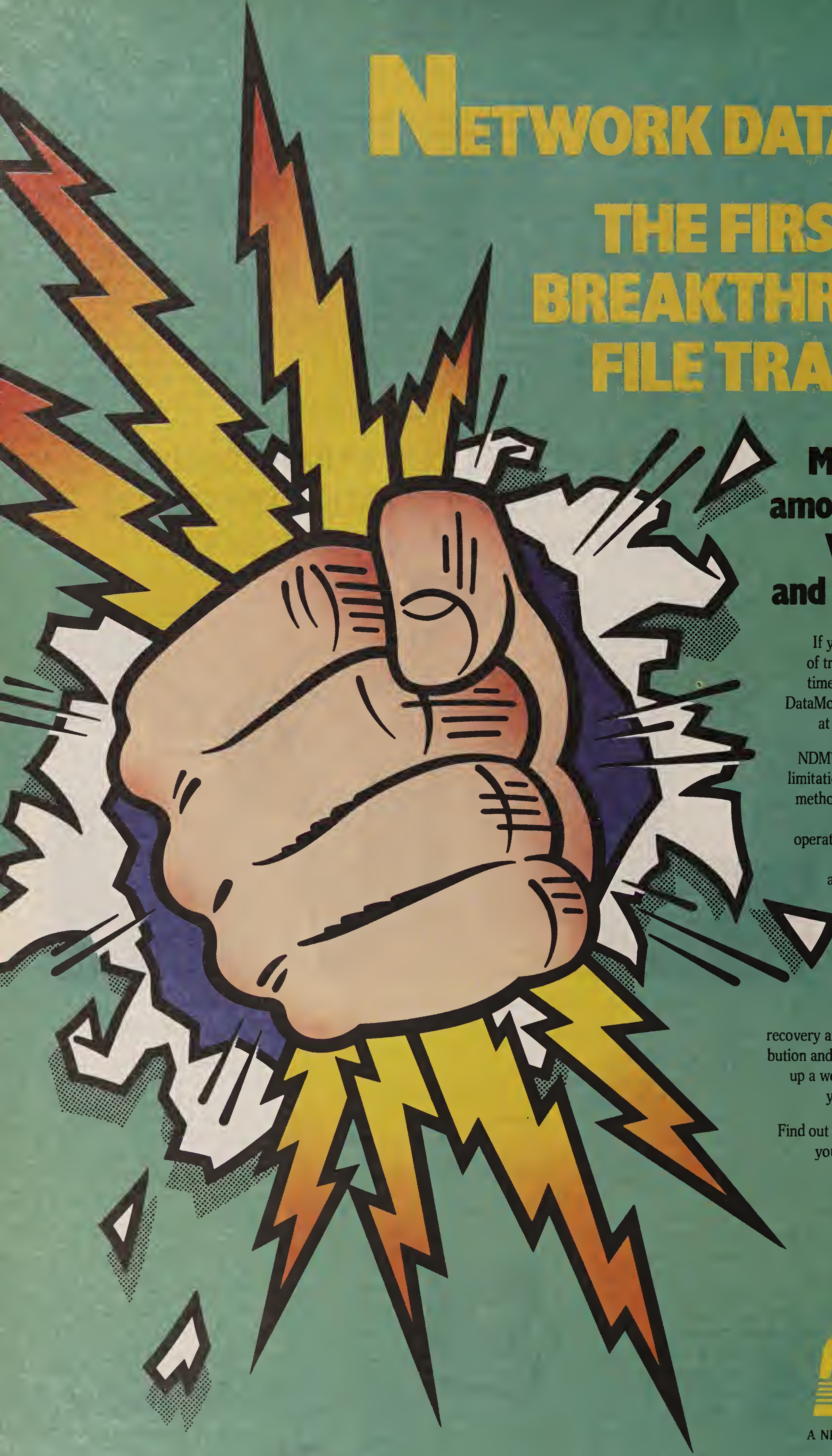

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LAN Ho! Navigating downsized data

BY RICHARD PASTORE

An archipelago of isolated islands, each with its own native language and customs. It sounds idyllic — unless you're talking about islands of data distributed across several local-area networks. Then the image becomes a Bermuda Triangle of lost data integrity, data inconsistency and incompatible security protocols.

Hal Mayforth

Many information systems managers see downsizing — with its promise of lower costs and greater flexibility — as their place in the sun. But many fail to grasp the darker data integration issues that go hand-in-hand with moving to smaller computing platforms. How do you keep a big picture of the data? How can you institute uniform security measures? Can dispersed data still be kept consistent companywide?

Consultants and IS managers grappling with these issues say there are no easy answers.

Maintaining a consistent, unadulterated central database in a distributed environment "is an illusion in 1990," says Tony Percy, vice-president of software management strategies at Stamford, Conn.-based Gartner Group, Inc.

"It doesn't seem practical right now," says James Miller, IS director at James River Corp., a Richmond, Va., paper manufacturer seeking consistent, cross-LAN data security.

Despite the challenges, veteran integrators say some simple, practical advice goes a long way toward fighting archipelago anarchy and better integrating distibuted data into an organization.

A good road map is needed

Planning ahead is a simple but surprisingly neglected idea. Before extracting data from the mainframe, "you have to set up an enterprisewide common data model and definition," Percy says.

The key is to find out at the start what data, if any, is appropriate for distribution, Percy says. He advises literally drawing a road map for the data, graphically showing what type of information the data represents, who needs access to it and how often it must be updated.

An even more basic question is whether data should be distributed in the first place. "A mistake a lot of companies make is to try to take data and distribute it when it really should be centralized," says David Owen, senior associate in information management and systems at Temple,

Continued on page 68

Beyond sunscreen, condoms and fiber

The Centers for Disease Control use networks to deliver a new preventive weapon: Information

INTEGRATING THE CUSTOMER

Centers for Disease Control

BY JOSEPH MAGLITTA

How many people die of skin cancer in California each year? Approximately 900.

Which state had the most new acquired immune deficiency syndrome (AIDS) cases diagnosed last year? The fewest? California with 5,794 and North Dakota with three, respectively.

Who in the U.S. is most in danger of dying from high blood pressure? Non-Caucasian men between the ages of 65 and 74 living in Washington, D.C.

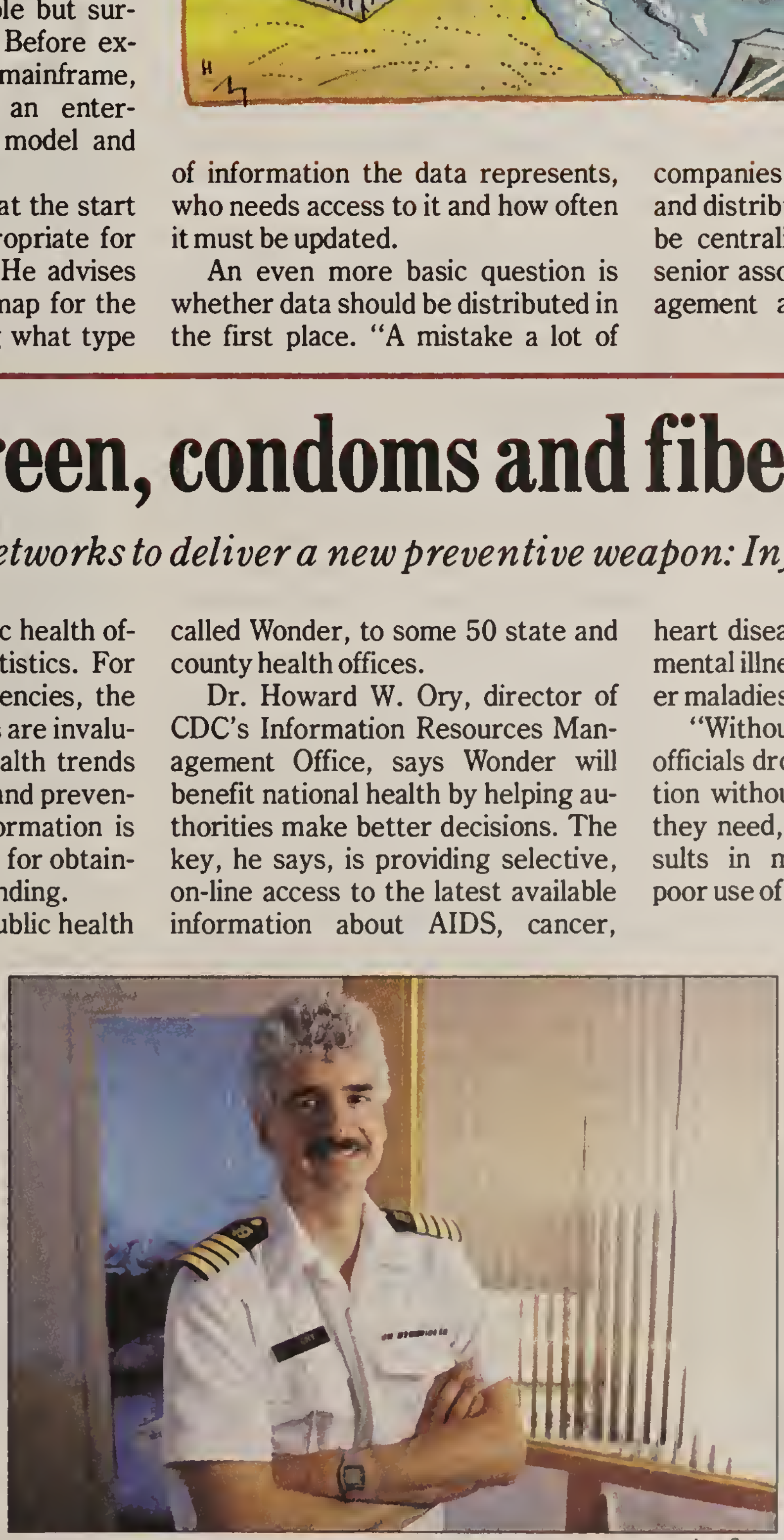
These facts may seem like interesting trivia, but for public health officials, they are vital statistics. For state and local health agencies, the answers to such questions are invaluable in spotting public health trends and planning educational and prevention campaigns. The information is also powerful ammunition for obtaining grants and program funding.

Unfortunately, good public health data is expensive, hard to find and difficult to sift through. To combat the problem, federal health officials have launched a pioneering effort that uses nationwide networks and personal computers to deliver public health information electronically to state and local agencies.

In January, the Atlanta-based Centers for Disease Control (CDC), the U.S.'s primary public health agency, began offering a new on-line information service, called Wonder, to some 50 state and county health offices.

Dr. Howard W. Ory, director of CDC's Information Resources Management Office, says Wonder will benefit national health by helping authorities make better decisions. The key, he says, is providing selective, on-line access to the latest available information about AIDS, cancer, heart disease, tuberculosis, environmental illnesses and thousands of other maladies.

"Without Wonder, public health officials drown in irrelevant information without finding the information they need," Ory explains. "This results in missed opportunities and poor use of public health resources."



Ann States

CDC's Ory: *Better data means better public health decisions*

Using Wonder, a novice user with a PC, modem and special software disk can dial into a CDC database and obtain highly specific information in seconds.

The user can then download and store the data on the PC for future analysis. It also can be mapped, charted, printed or plotted.

"It's fast and it's painless," test-user Dr. Gus Birkhead says about Wonder. Birkhead, director at the Bureau of Communicable Disease Control

To page 70

F.Y.I.

IBM has reorganized its systems integration efforts. Some 2,000 employees were shifted into the U.S. Marketing and Services organization.

IBM said its goal is to make more integration muscle available to local branch offices. Analysts say the move will put street-level pressure on major commercial integrators, such as **Electronic Data Systems Corp.** and **Andersen Consulting.**

Digital Equipment Corp. continues to forge ahead with its systems integration business. In recent months, DEC has signed numerous cooperative marketing agreements with the following:

- **McDonnell Douglas Systems Integration Co.**, makers of the Force Management System II. The operator-scheduling product lets telecommunications management forecast, schedule and track telephone operator work-force levels.
- **Computer Sciences Corp.** The nonexclusive service alliance will focus on distribution/logistics and telecommunications markets.
- **Arthur D. Little, Inc.** A nonexclusive service agreement to pursue systems integration and information technology projects. The focus will be on process manufacturing, telecommunications.
- **Consilium, Inc.** in Mountain View, Calif. Aimed at the manufacturing sector, the agreement enables DEC to sell and support Workstream, Consilium's factory-floor management software.
- **Andersen Consulting.** Focus will be on the distribution and logistics markets. Both firms will have cooperative marketing, sales and service in the U.S.
- **Israel Aircraft Industries** announced it will purchase $25 million of DEC equipment, software and services over the next five years. DEC will help IAI integrate computer-aided design, manufacturing and engineering functions and link multivendor network workstations and operating systems.

Apple Computer, Inc. and **KPMG Peat Marwick** announced a strategic alliance. The partners will provide consulting and systems integration services, specializing in Macintosh-based executive information systems and decision support systems.

Severn Companies, Inc., a systems integrator in Fairfax, Va., won a $13 million federal subcontract to help develop an automated patent system for the U.S. Patent and Trademark Office. Existing imaging systems will be replaced by an Amdahl Corp. 5990-based system with 200G bytes of storage.

Barker & Sloane, a management consulting firm in Lexington, Mass.

Analysts agree that large databases subject to constant enterprisewide access really belong on a mainframe. The easiest way for users in various departments to access the same database is via terminals tied into the host. Distributing the database across multiple LAN servers makes companywide access more circuitous at best.

As a first step, consultants and users advise, companies should look at who needs access to the data and how often it must be updated and redistributed — all before deciding to distribute it.

"If all of this sounds like Application Planning 101, it really is," says Brad Friedlander, a senior consultant in information and telecommunications systems at Arthur D. Little, Inc. in Cambridge, Mass. In this class, he adds, users must sit side-by-side with IS staffers. Evaluation teams should include a cross-section of information managers from the business side, Friedlander says. This group must iron out all the LAN-based data-handling processes, including security protocols and database updating procedures.

The consistency hobgoblin

Probably the most vexing data integration issue is maintaining a consistent central database in a downsized environment. With multiple users accessing and changing multiple copies of a database, the chances of keeping consistency and currency are about as good as finding a message in a bottle in the Caribbean.

"You can't guarantee that users uploading data from the LAN to the mainframe are going to take the same care in verifying the accuracy of the data before they upload it," Owen explains.

Also, users may not take the same precautions in developing and testing their own LAN-based applications, he adds. Such applications may in turn corrupt data and pollute the mainframe- or server-based database.

In fact, some experts suggest that managers simply avoid the problem by prohibiting user uploading. In the tradition of the mainframe database administrator, "you can have only one person authorized to do updates to the database," Friedlander suggests.

Greg Chetel, director of systems planning and research at Gillette Co., envisions such a setup for the Boston-based firm. "Even when you go to smaller platforms, you're still going to have to have centralized boxes where master data files are managed professionally," Chetel says. Currently, Gillette is still in the planning stages of downsizing.

If the database must be shared and updated by multiple users, experts say there are some safeguards IS managers can take. The first is to partition the database across multiple platforms by dividing it and distributing the portions on separate servers.

Another safeguard is to train the users who have the potential to corrupt the master database by making changes to the data on the LAN and uploading those changes to the host.

"You have to train the managers who have the departmental-level control and make them aware of the impact of what they're doing," says Bob Walsh, vice-president of Boston Systems Group in Boston and a downsizing specialist.

For instance, he says, users must be made aware that if they upload inaccurate data, they may quickly corrupt the integrity of the entire database. They also must understand the importance of thoroughly testing their LAN-based applications for accuracy in their data handling.

Battling data insecurity

James River is grappling with another data integration conundrum — consistent security protocols. The company recently formed an information technology committee to study the matter. The panel consists of the IS chief and information technology leaders from the user departments.

James River now runs two pilot LAN applications — financial consolidation and logistics scheduling — that once resided on an IBM 3090 mainframe. The firm is also developing new applications — management programs for the various papermaking processes — exclusively for the firm's LANs.

"Each time we develop a LAN-based application, the solution for data security is a little different from the one prior to it," Miller says.

In piecemeal fashion, the company has implemented a variety of off-the-shelf security packages on its several dozen Ethernet, token-ring and Novell, Inc. Netware corporate LANs. "We're propagating numerous [security protocols], and that's not desirable long-term," he says.

Miller says he wants a consistent form of data security and control comparable to what he had on the mainframe, which is handled consistently by a single package. "Once the committee makes a decision on how to achieve consistent security, implementing the security protocols won't be all that difficult," he predicts.

At Bristol-Meyers Squibb Corp. in Princeton, N.J., a five-member task force is focusing on data security as the biggest integration challenge in a downsized environment. "The group is putting together a plan to set up security and data administration functions just like we have on the mainframe," says Duane Presti, the pharmaceuticals manufacturer's IS director for finance.

The Squibb group is constructing data definitions and evaluating who should have access to what information. So far, "there's no quick fix," Presti says.

Squibb converted its U.S. profit center's budget performance reporting applications from the IBM 3070 mainframe because the host was not responsive enough. "The data never really worked for the business; by the time it was ready to deliver to management, it was too old to use," Presti says.

In January 1989, the company implemented a new performance reporting application — Sinper Corp.'s Table Manager 1 — on a Netware/286 network. The data is still downloaded from the mainframe but is manipulated on the LAN. "The users are much more satisfied with the LAN's performance," Presti says.

Borg-Warner Corp. in Chicago has adopted Netware security protocols to regulate user access to data. "We've broken [the LAN-based database] into accounting and human resource sections," explains Leonard Murrell, manager of systems and programming at the transportation equipment maker. "Only programmers and the database administrator can get to both."

Experienced downsizers say that downsizing also means that the IS staff will have to be retrained in order to deal with data integration issues. "Database administrators used to dealing with programmers now have to deal with real company users," Friedlander says.

The IS manager also must embrace a new role as lookout over data islands. "He won't necessarily have ultimate authority over the data," Temple, Barker and Sloane's Owen says. "But he gains a lot of control in knowing who is using data for read or update purposes."

Despite the headaches, users say that integrating downsized data has its positive points. Now, Presti says he has "a much better idea where everything is." •

Pastore is a *Computerworld* staff writer.

Experience tells: The upshot of data downsizing

Several tricky data management and integration issues can crop up in a downsized environment. The following are possible problems and solutions based on the experiences of users and consultants:

Problem: Maintaining a big picture of data that resides in a downsized environment.
Solution: Devise a companywide data road map that covers graphically what type of information the data represents, who needs access to it and how often it must be updated.

Problem: Maintaining database consistency.
Solutions: Retrain users to understand the impact of their actions, restrict uploading data to one database administrator and partition the central database across multiple platforms.

Problem: Implementing integrated data security protocols.
Solutions: Establish protocols with an IS/user planning committee, restrict data access with network operating system security protocols and avoid installing a hodgepodge of security packages on a piecemeal basis.

RICHARD PASTORE

EXCLUSIVE COMPUTERWORLD SURVEY

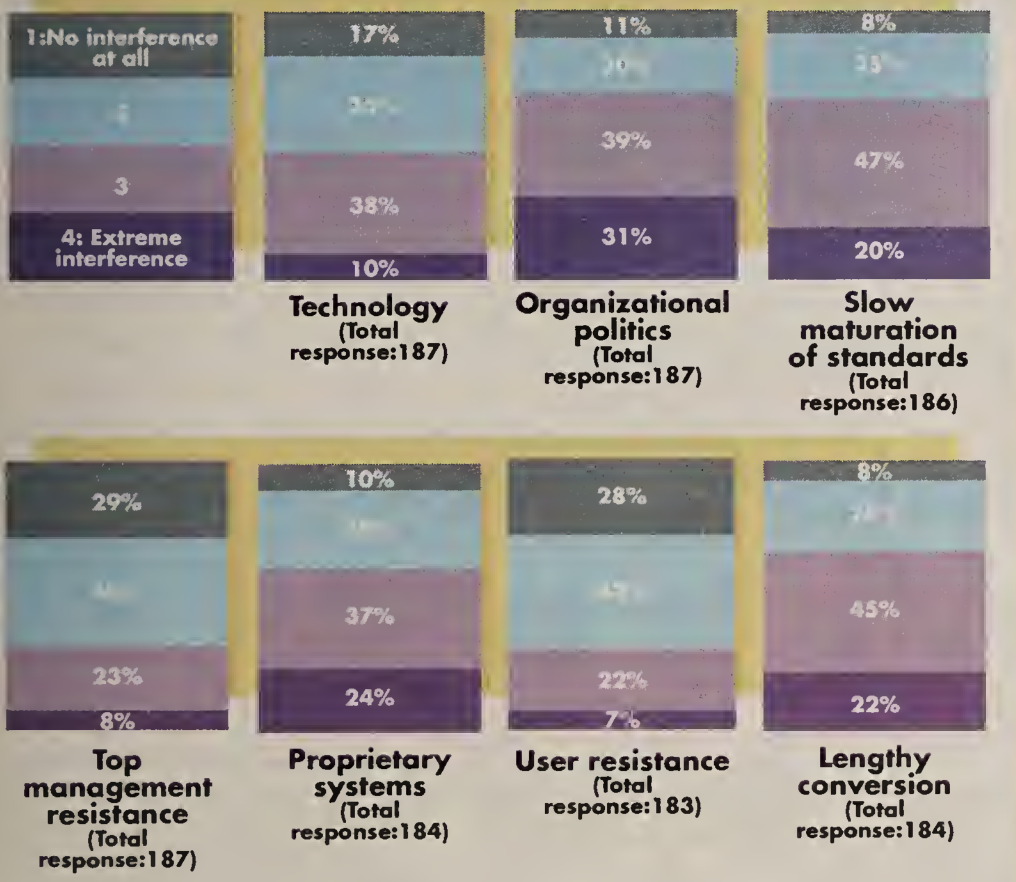
Downsizing

Downsizing. The word once struck fear in the hearts of information systems managers everywhere. Give up central control? Open up computing to the masses?

You bet. In a recent *Computerworld* survey of 194 IS chiefs, 48% said they consider downsizing an important part of their organizational plans. The IS managers cited greater flexibility, reduced costs and end-user processing power as being among the crucial reasons leading them to think small.

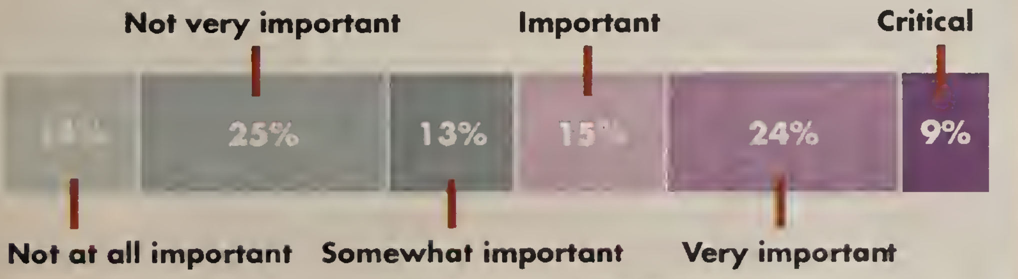
But moving to a downsized environment is not easy; organizational politics, immature standards, lengthy conversion times and proprietary systems can all slow the process. Surprisingly, respondents said they had very few problems with top management and end users during downsizing projects. IS chiefs agree: Small is beautiful.

"On a scale of 1-4, please indicate how much each of the following obstacles typically interferes with downsizing efforts."



"How important is downsizing to your organizational information systems strategy?"*

Percent of respondents, base of 194

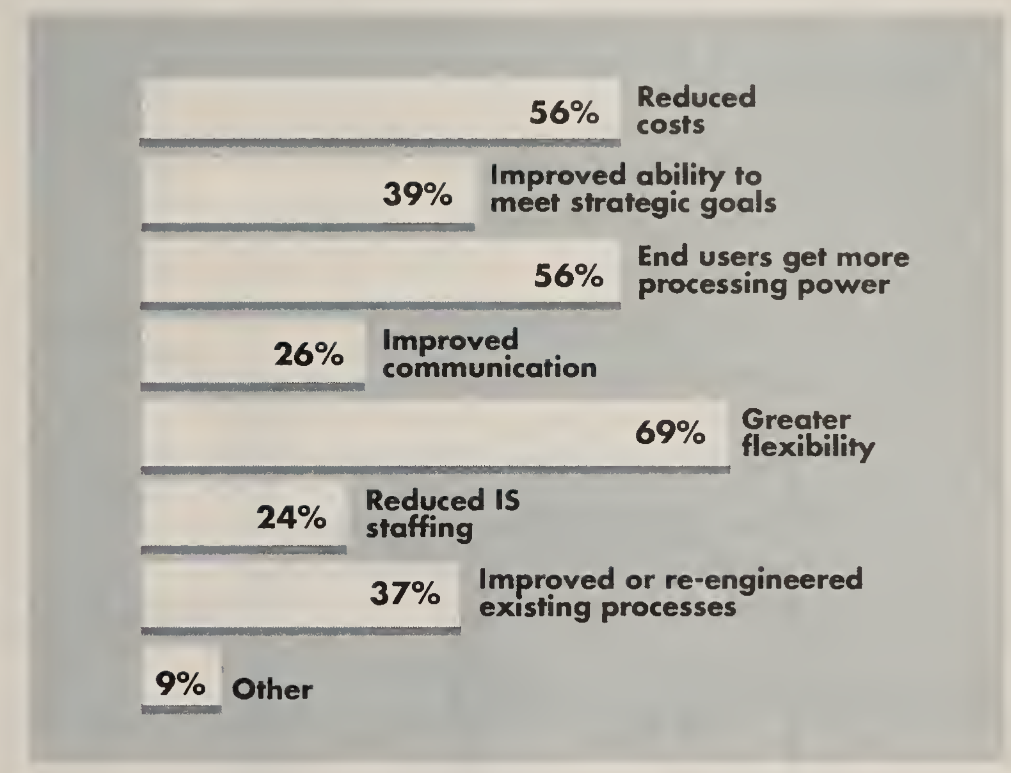


*Defined as moving from mainframe processing to networked PCs, workstations and/or minicomputers

CW Charts: Tom Monahan

"What do you believe are the principal benefits of downsizing to an organization?"

Percent of respondents, base of 194, multiple responses allowed



IN OTHER WORDS . . .

"We're studying a move right now from IBM 4381 mainframes to AS/400s. Doing so would enable us to go from several platforms — System/36s, 4361s and 4381s — to one standard platform.

Everybody is supportive of this move. Unfortunately, the initial investment is pretty high. We're going from equipment that has been depreciated off the books to buying millions of dollars' worth of AS/400s. That's a strong barrier to get by. But we intend to show how the move will cut our costs and provide application code twice as fast as [we can] today."

Tom Braswell
Vice-President of Data Processing
Genuine Parts Co.
Atlanta

"We started a project four years ago in which we said, 'Is there any way we can maximize the usage of the mainframe by offloading functions that are best done elsewhere?' Our direction is to centralize strategic data and operational data on the secure mainframe and to move all other data manipulation and functionality to networked PCs.

Our financial people download data from the mainframe to PCs and develop financial reports directly from there. If the president or VP doesn't like the way the report has been calculated, we can go back and change the calculation and have the information to him within hours. That's doing business strategically."

Leon Roomberg
Manager, Desktop Technologies
PHH Relocation Management Services, USA
Wilton, Conn.

"Our corporation recently decentralized, so my division is moving from a centralized glass-house IBM shop to a minicomputer, probably a Nixdorf. The machine will most likely handle corporate-type applications — accounts payable, order entry, that sort of thing. The benefits of the move will be cultural. Our machine downsizing coincides with our corporate downsizing. Both will enable us to be more responsive to markets as well as internally."

Robert Weese
Information Systems Supervisor
Aqualon Missouri Chemical Works
Louisiana, Mo.

for the New York State Department of Health, adds, "The real advantage is that you don't have to be computer-literate or a programmer to use the system."

Health officials say on-line access is a major improvement over painstaking manual searches through printed materials or reels of computer tape.

Stretching dollars

Developers say that by automating the process, millions of research dollars could be saved each year, freeing scarce funds. "A week of a CDC professional's time is $1,000," Ory estimates. "Say each of 1,000 researchers made one request a year. If we save one week's labor, that's $1 million to $2 million." Multiply by hundreds of requests from state, local and federal agencies, he says, and you have "savings of millions" in time alone.

Wonder uses local- and wide-area networks to provide no-cost access to CDC databases containing public health data and associated text. Information is funneled from various CDC, federal, state and local sources and then converted to on-line form on an IBM 3090 mainframe at CDC headquarters in Atlanta. Internal and external users are connected via Novell, Inc. LANs and T1 WANs from Vitalink Communications Corp. in Mountain View, Calif.

Wonder is part of a CDC outreach effort to state and county health officials. By electronically integrating its "constituents," Ory says, CDC hopes to help both local and federal authorities squeeze the most from scarce public health dollars.

"In most states, a state epidemiologist has a small staff and is starved for money. Many do not even have a programmer. [Wonder] will make it easier for him to say, 'I wonder how many people died in my state of such and such a disease.' "

Health officials seem to like the idea and appear hungry for the technology. "We're terribly excited," says Henry Bradford, director of the division of laboratories for the Louisiana Office of Public Health. "We're the first-line troops in the trenches. [Wonder] gives us an invaluable power to address and respond quickly to all kinds of diseases."

Ory says the idea for Wonder came in 1987 after he visited a local stockbroker. He was impressed by the wealth of information that was available from the broker's computer trading terminal.

Ory, a physician, epidemiologist and 20-year CDC veteran, took the idea back to CDC. The agency's new director was eager to revamp its computer systems and approved $400,000 in initial funding.

Assisted by students from nearby Georgia Institute of Technology, Ory's six-member team solved the technical problem of handling huge data files by highly indexing each file for speedy retrieval.

Developers wrote menuing and database calls in Reston, Va.-based Software AG's Natural language and used the Adabas Version 5.0 database. They then built a software bridge to permit easy data sharing between the two applications.

Because the system was intended to help researchers, doctors, administrators and other noncomputer users, developers took great pains to make Wonder easy to use. They created a simple menu and added extensive on-line Help.

In a typical session, a user signs onto the CDC mainframe and selects Wonder from a VTAM applications menu. He then selects a data set (e.g., mortality) and other desired criteria, such as age, race, state, county and disease. Finally, he chooses the display and printout options.

Currently, Wonder users can access four CDC databases on AIDS, alcohol, U.S. health statistics and mortality. Eventually, Ory says, Wonder will include "hundreds or thousands" of databases.

Organization: Centers for Disease Control
Goal: Deliver up-to-date public health information electronically to health officials around the country.
Strategy: Offer an easy-to-use on-line information service for PCs.
Payoff: Save millions of research dollars and provide more and better data to combat such illnesses as AIDS, cancer and heart disease.

Development costs for Wonder have so far totaled an estimated $2.5 million. Ory says most of the expense has been for paying CDC technicians to handle the laborious but crucial task of inputting data, which can take several months.

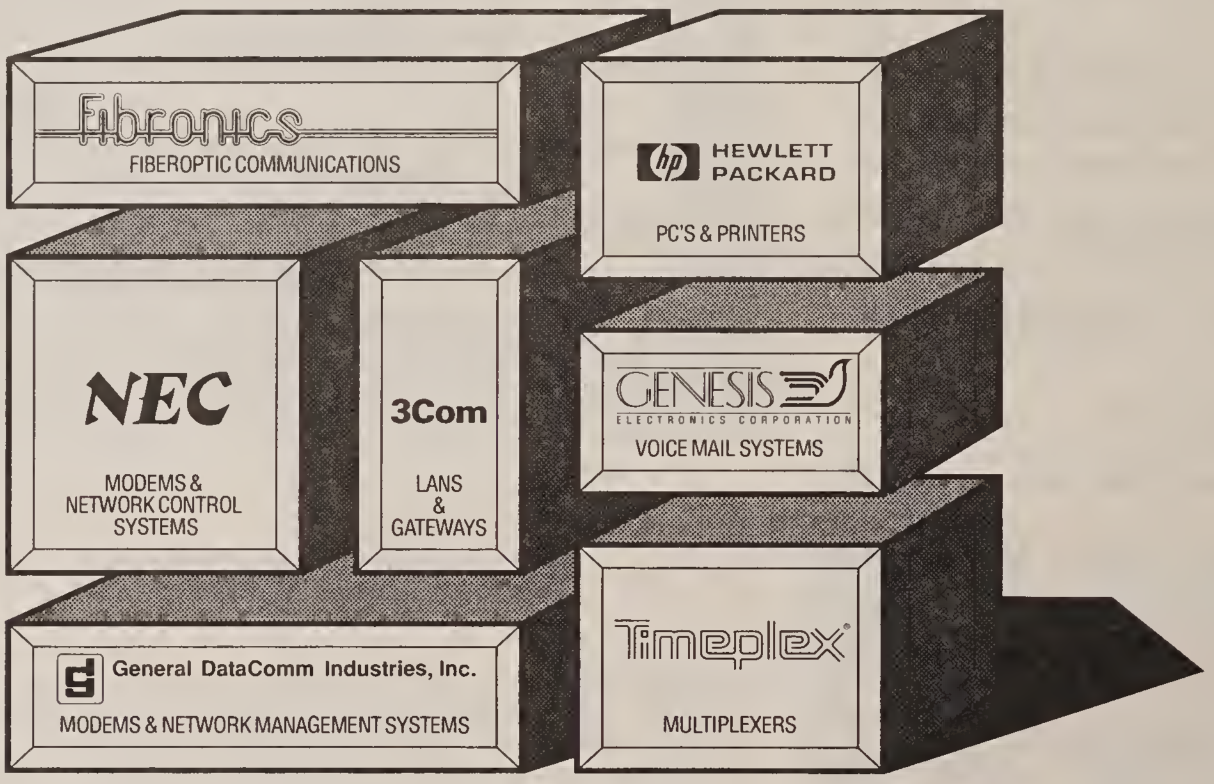
Nonetheless, CDC officials maintain that Wonder's benefits will quickly outweigh its costs. Ory says Wonder can advance public health in states by helping to raise awareness — and funding. "Every time we show it to a health officer, they all say the same thing: 'If I could come up with data and maps and graphs and something that looked solid, I could convince my legislature that we had a problem and we needed their attention and money.' "

Wonder will help officials distinguish between small outbreaks and epidemics, Bradford says. It will also help departments gauge how successful their programs are, Birkhead adds.

By far the biggest payoffs, Ory says, will be the long-term ones. "If we indeed make better decisions because more and better data is brought to bear on important health issues like AIDS, the environment and heart disease, then the dollar benefits will grow."

CDC is a finalist in the Computerworld Smithsonian Awards.

Maglitta is a *Computerworld* senior editor, in depth/integration strategies.



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INTERVIEW

Systems integration today and tomorrow

Business trends are pushing development and processing to outside firms, but IS chiefs need to maintain control, says CSC's Melvyn Bergstein

Information systems as a strategic, not a hands-on, function. Systems integrators becoming information processors. More cooperative processing in a downsized, globalized world. Commercial integrators that are more sensitive to customer needs.

These are some of the visions of systems integration, present and future as seen by Melvyn E. Bergstein. Bergstein speaks with authority befitting his background: 21 years with Arthur Andersen & Co., including stints as managing partner at Andersen Consulting's Technical Services Organization and as a director at the parent firm.

Last July, Bergstein became a senior vice-president at Computer Sciences Corp., the parent corporation of Index Group, Inc. and a major player in the government systems integration market. His new job is to guide CSC expansion into the commercial sphere. He recently spoke with Computerworld Senior Writer David Ludlum.

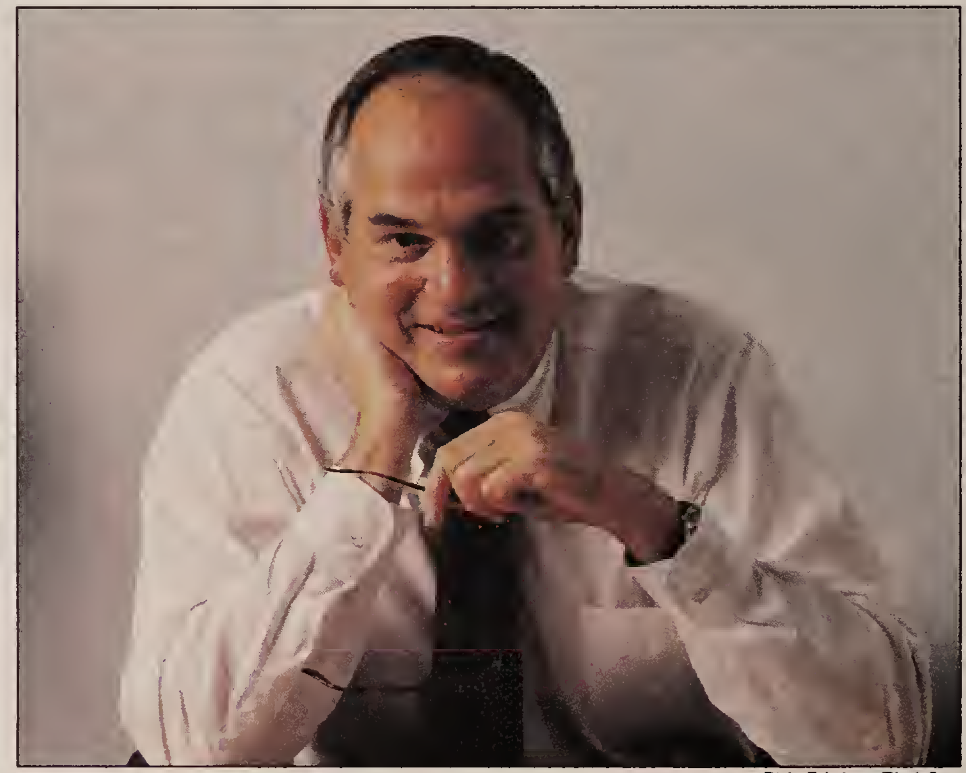
What's driving the growth of the commercial systems integration business?
The most important thing probably is the increased competition in almost every industry in the world because of globalization. Because of increasingly efficient, cost-effective transportation and the ability to communicate around the world instantly, management has been driven to look for any competitive advantage it can gain, and information technology is one of the areas that has been significant.

One of the keys to survival today for American business is to streamline costs and make them as variable as possible. In the 1960s and 1970s, most information technology work was done internally. What that did was create a lot of fixed costs — that is to say, programmers, analysts and systems people tend not to be variable costs; they tend to be fixed costs because of maintenance requirements and everything else.

In the 1970s and '80s, we saw the growth of the consulting industry. The reason was that consultants could do large development projects and then leave. Head count control, which became fashionable in the late '70s and '80s, was a response to this variable cost issue.

Integrators go one step further. Integrators will develop the system and operate it for a company and charge back in many cases on a transaction basis. The analogy I like to use is hamburgers. An integrator can develop a system, capitalize its costs and operate it and then charge the company back on a transaction basis — that is, based on the number of burgers. That makes that cost purely variable. What is involved there is some risk-sharing.

How is globalization driving systems integration?
The obvious thing is that most systems integrators have international operations. The other thing is that globalization and decentralization have a lot to do with networking. Some people in some organizations say the network is the company. Why are we seeing disintermediation — the lessening of layers in an organization? Because the network is enabling communication from the highest levels of management down and then back. So the network is essentially taking the place of the organization, the hierarchy.


Rick Friedman/Black Star

Are there any other management factors driving things?
The other [management] thing driving integration is that we're seeing companies reorganize, restructure. A lot of the restructuring is driven by use of information technology. Organizations that are changing and have IS groups that are used to the old paradigm need outsiders to come in and really work across organizations and create new organizations.

And I think we see a lot of downsizing of IS organizations. CIOs are beginning to realize that what they absolutely must control is strategy. They must control development — that doesn't mean they have to do development, but they have to control it. But they don't have to have a large in-house organization to do that.

Does the trend toward decentralizing and placing IS within business units affect the need for systems?
Absolutely. What we saw in the 1980s was a restructuring of American business. Today, there are very few conglomerates left on the scene. Most firms are focused. They've gotten rid of noncore activities, and they've bought companies around their core. Phillip Morris is the best example.

Companies that understand their business well can formulize it. They understand the control factors, the key success factors, and they train their people in them. Once they do that, they can decentralize, because everybody knows what the game is. Corporate management becomes closer [to operations], but what they're really doing is setting standards, looking at opportunities within the context of what they know how to do.

McDonald's is an example of a company that really has a great formula and can decentralize management because everybody knows what to do and how to do it, how to run the business.

What role does IS play in that? A key role. These units are managed on a decentralized basis, but they have common systems within which the key success factors are buried.

What technical trends are driving the business?
We're going through some fundamental architecture changes — not a whole lot different from the batch to on-line architectural change. What we have is the information technology community caught in a big skill shift. We're going from essentially centralized, shared processing to cooperative processing, which is a much more effective, much more cost-effective way to operate.

What kinds of mistakes are commercial systems integrators prone to making?
A mistake that systems integrators make is to believe that they're running the company. Systems integrators have to make sure that the customer controls the project. The customer needs to understand the details of project management. Even if the integrator runs the project control, the client needs to be able to assess progress so he can assess budget adherence, schedule adherence and quality.

The other problem is that because of their own economics and their own tunnel vision, many integrators don't understand the tremendous problems that change creates in an organization — the anxiety, the stress levels, the organizational issues. Only the CIO and senior management can make the judgments about how fast technology can be absorbed and what organizational changes need to be made to make it effective. I think that if there have been mistakes, it's because integrators have taken more responsibility than they should.

Can you suggest a checklist that would help IS managers and CIOs maintain control?
I'd say that the first is strategy. That's not to say that [users] can't use advisors to help them develop strategy. But the bottom line is that the management is responsible for strategy; they have to understand it to its finest detail. There can't be any assumptions or any implications that the manager doesn't understand well.

Second is controlling development — not necessarily doing the work, but controlling it. They need to control what to develop, when to develop it and why to develop it. An integrator can get involved in how to develop, in the actual development

Continued on page 73

itself; even in where to develop.

Third, I think that every customer who does large integration needs to have good project control capability. I would say another thing is absorption into the organization.

Absorption?
Absorption means how quickly the user population can absorb the new system and technology.

What's your prediction for integrators over the next few years?
I believe that in-house IS is going to become much more of a management and strategic function and much less of an actual "doing" function. It's like publishing: A school book publisher doesn't print or bind books. It doesn't write the books. Publishers provide quality control — they edit and look at the effectiveness, but they don't need to write the books.

Anything else?
I think the other thing that's supporting this trend toward integration is the whole notion of networking. In many industries, buyers and suppliers have receivables and payables systems that are two sides of the same coin. You would think there would be one system that transactions could be cleared through by buyers and suppliers. When you're in a business that has many buyers and suppliers, all this is leading to big cooperative utilities that operate for buyers and suppliers in a particular marketplace and allow the clearing of transactions.

That sounds more like a processing services company than a systems integrator.
I think there's going to be no distinction. We're seeing that integrators have to be in the processing business. Outsourcing IS operations is just one step on the road toward that.

You see a blurring of distinctions?
Yes. There are some good analogies with the railroads in the 1800s. Each railroad had its own gauge track, its own special equipment and everything else. The utility of those railroads was very low relative to what it became in the 1880s when standards were established for track and so on. The utility of the railroads became enormous because you could run all around the country and you didn't have to stop and transfer all your cargo to another car.

The people who became the big railways were the standard-setting operations. The people that actually became the co-ops that ran across different railroads and different regions became the big railroad companies, and I think that's what's going to happen with integrators.

Would an IS person who hears that feel a bit threatened?
I don't think that IS people should be threatened by all this. What it really means is that there is going to be a great role in the future for IS people. I think that IS people will wind up [working for] these large integrators — in these large central information processing utilities — where there will be great opportunities for career advancement. I think we'll find in these organizations the *creme de la creme* of the IS people who are really the strategists and managers that use those utilities. •

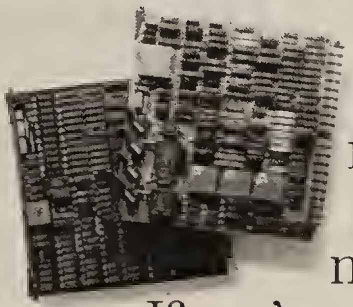
F.Y.I.

Three network executives from junk-bond has-been **Drexel Burnham Lambert, Inc.** have turned up at **Republic Management Services Technologies, Inc.** The Manhattan-based systems integration and network management firm targets Wall Street financial services firms. Moving into new slots are **Chuck Coleman,** ex-Drexel vice-president for communications planning, **Fred Edelstein,** ex-vice-president of advanced technology, and **Gary Adams,** ex-assistant vice-president of advanced technology.

Ovum Ltd., a London research firm, reports that integrating computer-aided software engineering tools is the biggest CASE concern of the 1990s. Major issues include presentation integration, which enables tools in software development to share the same user interface, and control integration, which enables users to automate parts of their software development.

The San Francisco branch of **Systemhouse, Inc.** nailed a $4.2 million contract to provide systems and integration services for a new marine terminal in Los Angeles, owned by Tokyo-based **NYK,** the world's largest shipping company. Systemhouse systems will handle terminal control, inventory, yard and vessel planning decision support and other management functions.

Softech, Inc. in Waltham, Mass., a software and systems integrator, will acquire **Information Decisions, Inc.** in Grand Rapids, Mich. A privately owned firm, IDI is a systems integrator and value-added reseller of local-area network products and services.



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Douglas brings costs back to earth

Manufacturing system helps aircraft maker return to profitability

INTEGRATING MANUFACTURING

Douglas Aircraft

BY JANET MASON

Back in 1983, Douglas Aircraft Co. decided that to make any money, it needed to either throttle back on climbing operating costs or risk falling from the sky.

Despite sales of $1.9 billion and a stream of new commercial and military aircraft orders, the Long Beach, Calif.-based subsidiary of McDonnell Douglas had operating losses of $52 million. Overworks and reworks were common, and assignments were made at random. Chillingly, company officials say, workers often ignored plans and built from memory. Worst of all, nobody knew where the high costs were coming from.

Not surprisingly, the few information systems supporting final assembly and test flight operations were slow and nearly useless. Often, status reports arrived a full 24 hours after the events they tracked, says Larry Selby, Douglas' manager of production systems operations control. "We found that what systems did exist were tailored to provide reports to the folks in the offices rather than for the workers actually building the planes," Selby says.

Problems only worsened as production increased and more assembly workers were hired. Hoping to turn things around, Douglas executives began a huge internal shake-up. Management was flattened from eight layers to four, manufacturing information systems were rethought, and assembly line workers were given a much wider charge.

New culture, new system

Today, Douglas is no longer a dollar-eating giant. In 1988, the company raked in profits of $127 million on sales exceeding $4 billion. While Wall Street analysts continue to voice concerns about Douglas, they say the company appears to have hit clearer skies. Douglas officials credit at least part of the turnaround to a new integrated Assembly Tracking and Management System (ATMS) that reflects the firm's new, sleeker, worker-oriented culture.

"We wanted to design a computer system to address the line workers first and then, as a by-product, to provide information to the administrative people," Selby explains.

Alan Levenson

Douglas Aircraft's *Richard Brundridge (left) and Larry Selby cut operating costs to keep the company in the air*

The $3.5 million ATMS system integrates six Douglas manufacturing locations around the country. Its goal is to improve work flow and quality assurance by giving line workers immediate access to on-line information.

Using ATMS, assembly workers can stay informed about the current status of each assembly operation on every commercial and military airplane being built at Douglas plants in Palmdale, Calif., Columbus, Ohio, Salt Lake City, Macon, Ga., and Long Beach.

ATMS lets workers track the assembly process, including each aircraft's status, project delays, work assignments and the availability and skill levels of employees. It also enables supervisors to schedule tasks more efficiently, assist quality assurance inspectors and provide management with reports.

The system resides on an 8M-byte Unisys Corp. 100/94 mainframe in Long Beach that is connected to an IBM 3090 via a hyperchannel. It is used by 14,000 employees, who access the system through 1,500 Lee Data Corp., Phase, and Intelenet Corp. IBM 3270-type terminals.

The ATMS system is written in Mapper, a fourth-generation language (4GL) program from Unisys, explains Richard Brundridge, group leader of ATMS.

What's remarkable, Selby notes, is that every one of more than 275 different programs was written by analysts without any help from programmers. The end result? "Design, development and maintenance was done with about one-tenth the resources previously required," he says.

Such dramatic savings are possible, Selby says, because the 4GL lets analysts develop prototypes and programs literally overnight. The result is savings of thousands of dollars and hours in development and maintenance costs and time. Instead of being patched, old programs are simply discarded and rewritten.

The payoff: Defects that needed rework were reduced by 25% using the system, according to Selby. What's more, he adds, line workers now have more of a role in deciding how to assemble aircraft, rather than having "the boss telling them what to do."

Beats paper

Anything had to be an improvement over the old way of doing things.

"It takes about 12,000 to 15,000 assembly orders per week to create a plane," Brundridge says. The previous computer system for assembly and testing used a simple handwritten computer worksheet at each location containing information on how many employees worked on each part of the airplane. Each night, worksheets were batch-keyed into the 3090 to estimate how long each job took and how close to the plan its performance was.

With this system, supervisors did not consistently review every day's work. Employee assignments were neither followed up nor prioritized. As a result, Selby says, getting an accurate picture of where costs originated was impossible.

> "WE FOUND what systems did exist were tailored to provide reports to the folks in the offices rather than for the workers actually building the planes."
>
> LARRY SELBY
> DOUGLAS AIRCRAFT

The previous quality control process had another Achilles' heel: It almost guaranteed that line workers would have to go back and rework sections of the plane to meet specifications. "Rework is the most expensive part of building an airplane," Selby explains. "When one assembly has to be redone, the workers also have to take apart the surrounding assemblies on the plane."

Piece by piece

Prototyping for ATMS took place late in 1983. A prototype of 10 programs was developed by one analyst in just three days. Over the course of the next six months, two analysts worked on the initial set of production programs. Most of the time was spent coordinating organizational definition and work flow. In all, Brundridge estimates that ATMS took 4,000 man-hours to develop.

The initial implementation took place early in 1985 on the MD-80 line, formerly known as the DC-9, in Long Beach. "We started in one department and followed the airplane down the assembly line, starting with the nose, wings and fuselage and going to the flight ramp," Brundridge recalls.

During implementation, another

Continued on page 80

Mason is a free-lance technology writer based in Philadelphia.

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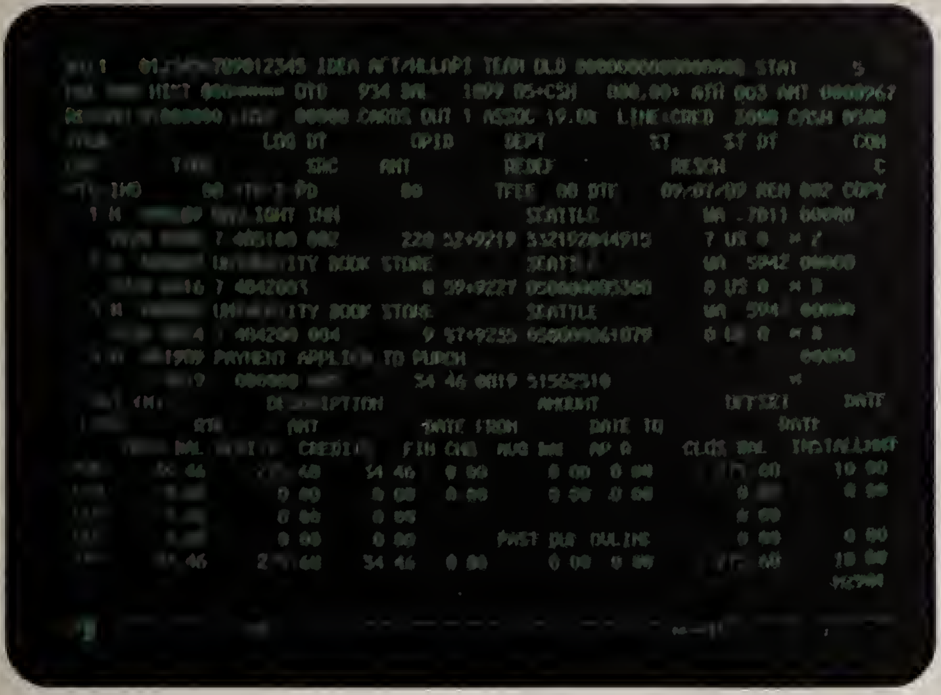

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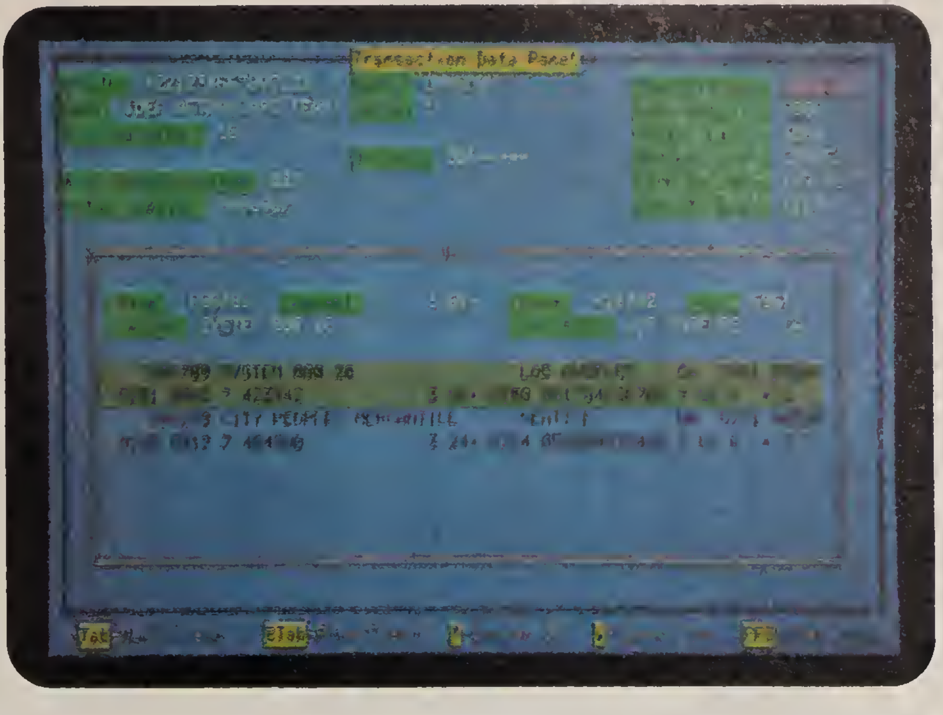

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issue emerged: How do you bring a Unisys-based system into a traditionally all-IBM shop?

"It was difficult," Brundridge recalls. "We encountered some resistance, but we were able to convince people that in labor savings alone, it was worth it."

Because of previous bad experiences with service from the former Sperry Corp. (now part of Unisys) more than a decade ago, some people were hesitant about Unisys, he says. To assuage IS and general management's fears, the production systems team had the Unisys ATMS application up and running within six months.

The C-17 military cargo units came online in 1988. Installation on the MD-11 line is about halfway completed, officials say, with work expected to be done by the end of the year.

Along with providing line workers with the information they need, Douglas officials say that ATMS also benefits other employees.

Time saver

"Prior to using ATMS, the first-line supervisor spent two to six hours making work schedules, using paper and pencil and organizing employees for a day's activity," Brundridge says. Now, because all the information is in one place, the same work can be scheduled in 10 minutes, he says.

Another benefit is that managers and planners can "see into the shop through the terminal on their desks," Brundridge explains. "They can check attendance, analyze recurring problems and enter the data into graphics packages to create reports" for senior management and the U.S. Air Force.

The reports contain information on how many airplanes are produced per assembly line in a given time period and whether the production team is meeting its schedule. The system accurately records what time was spent on each task instead of estimating it.

> THE TEAMS — consisting of line workers (mechanics), planners, management and those in the tool department — use the computer as a communications vehicle.

Employees can also check the system for information on the assembly line in front of or behind them, Brundridge says. "If they wanted to, they could check information on other [plane model] assembly lines," he says.

Officials say ATMS has also helped with troubleshooting. Now, when an assembly line employee comes across a problem that hinders production, a "job delay" comment is entered on the record. The work team then concentrates on resolving the glitch.

When the assembly job has been completed, quality assurance inspectors are notified by the system's electronic bulletin board.

According to Brundridge, "The system brings work teams together." The teams — consisting of line workers (mechanics), planners, management and staff members in the tool department — use the computer as a communications vehicle.

"If the mechanic can't complete the job because something was planned incorrectly," Brundridge says, "the group finds out immediately [through the computer system] and meets as a team to solve the problem."

Organization: Douglas Aircraft
Goal: Improve work flow and quality of plane construction; improve expense and labor tracking.
Strategy: Create a nationwide assembly and manufacturing tracking system.
Payoff: Rework cut by 25%, more line-level responsibility, big contribution to $127 million profits.

Because the system instantly shows whether there are any delays or needed parts, the line workers do not have to wait for the quality assurance inspectors to catch the problems later.

Only a start

Despite such successes, Douglas can hardly afford to rest on its laurels, says Martin Bollinger, an aerospace industry analyst at Booz, Allen & Hamilton, Inc. in New York.

"Douglas Aircraft has had trouble shipping aircraft, and its financial performance has been poor in the last five years," Bollinger says.

Military aircraft sales are down, he notes, and Douglas is not meeting the demand as well as it could. "These are good times for the commercial aircraft business, but Douglas hasn't been able to meet the demand that is out there," Bollinger says.

Wayne Brewster, a Unisys sales manager in Los Angeles, notes that participative management and shop-floor information systems have helped make Douglas more competitive.

"The days of cost overruns are over," he says. "Both commercial and military operations have to become more efficient." •

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Real-life tips on how to select, package and integrate information

INTEGRATING INFORMATION

BY ALAN J. RYAN

Load one seat. Skip two. Load another. Skip two more.

Like a Ferris wheel operator balancing the weight of riders at a carnival, information systems workers of the 1990s will find themselves constantly trying to balance the flow of information to their organization's executives. Provide too much, too little or the wrong kind of information, and things (including careers) quickly become unbalanced. Do a good job, and everyone gets a smooth ride.

The role of IS is fast becoming one of user demand for information that was undreamed of a few years ago. For many today, the job involves locating information sources, sorting out what is useful and putting it into usable form for the company's top brass.

In the coming decade, the most successful organizations will be those that effectively integrate internal and external information, says Rudy Bozniak, consulting manager at international management consulting firm United Research in Morristown, N.J. And IS can lead the charge, he says.

Unfortunately, the task often is easier said than done.

In many organizations, IS managers are still "throwing information over the wall and praying that somebody likes it," says David L. Taylor, vice-president and director of inter-enterprise systems at Gartner Group, Inc. in Stamford, Conn.

The following are tips from users and consultants to help you more effectively select, package and integrate information resources in your organization:

John Pirman

- **Look beyond your nose.**

The first step toward success is making sure to consider all possible sources of information. Active IS workers who have the time, inclination and funding will look beyond their corporate walls for information that can put them in the IS Hall of Fame.

"There are mountains of information out there," Taylor says. "People should be asking themselves, 'If there are 3,500 public databases out there, what is in those databases that could be useful to my company?' "

Consultants say IS needs to look beyond simple sales and financial data to other areas. For example, companies gauging product acceptance traditionally look at sales revenue, Bozniak says.

However, other indicators can provide even more telling data: information on pricing or discounting trends, key customer orders vs. orders from new customers, sales returns and cancellations, percent of market share in both dollars and units, warranty and repair activities to track viability of the product and increases or decreases in complaints and inquiries.

The point is simple: To get a complete picture, you need to evaluate as many sources of news, marketing, financial, research, government and other kinds of information as you can find.

- **Be open-minded about technology.**

The quest to effectively manage information will lead IS to try new technologies such as expert systems and artificial intelligence, says Larry Runge, project manager of fleet services development at General Electric Capital Corp. in Stamford, Conn. These technologies can be a great help in pulling together information scattered throughout many systems with just a few simple commands, Runge says.

While today's executive information system (EIS) products provide information to help executives make better decisions, Runge predicts, tomorrow's will go a step farther.

A caveat: Runge and others caution that even the most cutting-edge technology is wasted if organizations don't put the information to good use.

- **Know what users need.**

Knowing what to give users is the most important ingredient for success. In organizations that handle information poorly, IS is not necessarily at fault, Taylor says.

The real problem, he says, may be that corporate executives simply do not know what kind of information they want or need nor will they make time to discuss it.

Because they do not vocalize their needs and concerns, high-level users can find themselves in the lurch. "In general, people are not getting the information that they want," says Patricia Seybold of Patricia Seybold's Office Computing Group in Boston.

Seybold says IS workers need to find out what information executives and other business users need in order to do their jobs, what information they are missing and what they would like to have if they could.

"People are asking those questions today," she notes, "but maybe there is

Continued on page 82

Seven effective ways to gather information

- **In-depth interviews with executives.**

Benefits: Information systems professionals can observe how executives work, then discuss what kinds of information is needed.

Drawbacks: Most executives do not have a day or two to devote to this lengthy process.

- **Short interviews with executives.**

Benefits: IS workers can focus on specific areas to be addressed by the system.

Drawbacks: Requires IS people to understand executive roles and needs; executives might not have time to think of all their needs during a short interview.

- **Interviews with subordinates of executives.**

Benefits: Gives IS workers a good grasp of the information that executives require of their workers.

Drawbacks: Some executives believe subordinates are the most effective method of information-gathering and thus do not want to automate the process.

- **Rapid prototyping.**

Benefits: Allows users of the decision support system to quickly see and use a real system, making changes as necessary.

Drawbacks: IS may have to make many prototypes before satisfying users. This can be a long process.

- **Monitoring computer usage.**

Benefits: Lets IS department see what kinds of information the executives use regularly, then build a system to simplify the process.

Drawbacks: Can be time-consuming.

- **Outside sources.**

Benefits: Can provide users with information on competitors, etc.

Drawbacks: Requires research to find out what type of information is available outside the company.

- **"Dump and pray."**

Benefits: Few.

Drawbacks: A hit-or-miss approach. Can be frustrating for IS workers and users alike.

ALAN J. RYAN

Delivering

CONTINUED FROM PAGE 81

something wrong in the way they are asking." Fortunately, IS managers can employ several proven techniques to ensure a solid understanding of users' needs.

At Unum Life Insurance Co. in Portland, Maine, a new chief executive officer wanted to begin integrating information from all corners of the company. The goal was to view daily sales and claims data that had previously been available only quarterly. Unum installed a packaged EIS system from Pilot Executive Software to integrate information from each division.

"We developed the plans with the [divisional] systems and business people to decide what information would be feasible and what would make sense," explains Susan Eliot, a staffer in Unum's corporate research and technology department.

Meeting with executives is clearly the best way to determine the critical success factors that will make a system thrive, says David W. De Long, research associate at Harvard Business School.

Sadly, only one in 20 companies typically go that route because of time constraints, says De Long, co-author with MIT's John F. Rockart of *Executive Support Systems: The Emergence of Top Management Computer Use.*

- **Be persistent.**

At A. H. Robins, a division of American Home Products Corp. in Richmond, Va., IS persistently dogged top executives to sit down for a needs analysis of a proposed sales and marketing system.

If potential users have no time to be interviewed, keep going back, advises Connie Frudden, senior information center analyst at Robins. "If it takes coming in at 6 a.m., do it.' "

- **Create a team.**

The chemical division of American Cyanamid Co., an agricultural and medical products manufacturer in Clifton, N.J., has formed an IS team whose job it is to deal with executive support.

Mark Albala, manager of executive support, says the group has worked well. Its latest success was providing one marketing manager with an EIS in just more than two weeks that lets him look at his area's sales each day. The user can also look beyond the sales data and compare current sales with yesterday's, last week's or last year's figures.

The team approach apparently worked: Outside information, such as competitive information and news services, is integrated with information from Cyanamid's own production systems to provide the proper mix for the executives, Albala says.

- **Be flexible when gathering information.**

Once user needs are known, IS needs to figure out how to best gather information from disparate sources — databases at varied locations, stand-alone computer systems and, in some cases, file cabinets.

Even if the resources exist to collect the information — paper-based collection, distributed databases, through personal computers on local-area networks — the process can be expensive and time-consuming.

GE Capital's Runge says that while it's a good idea to have a detailed list of all available source data, it is impractical for his department to spearhead that effort.

United Resources' Bozniak disagrees, saying that a matrix of data sources can be justified because it can greatly reduce the time needed to search for information for each project. "If we look at IS as an honest broker and keeper of information," he says, "the cost savings to the firm can pay back the cost to develop this matrix many times over."

- **Don't underestimate your IS staff.**

Most often, data is collected with the help of IS people who work within the company's business units. These workers prove their value in helping to take mounds of information and disseminate the most important data to executives.

Although many of the IS people working on the EIS project at Unum had no sales or claims-processing background, Eliot says, "by being able to ask enough questions, we have learned what makes sense and what doesn't make sense."

- **Put on a business hat.**

IS people need to put on a business hat to understand the requirements for running a business. Bozniak says IS should always think in terms of creating an optimum business application and should then create a system to meet those needs. •

Ryan is a *Computerworld* senior writer.

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Inside Edge

Avoid mistakes with systems integrators

What do you think is the biggest mistake information systems chiefs make when dealing with systems integrators?

GEORGE VAN NESS
National Director
Information Technology Consulting
Coopers & Lybrand
New York

One of the biggest problems is that clients, who start off with an ill-defined problem, think that by going to a systems integrator, they can transport all of the risk of the project to that company.

We're good at helping customers manage the risk but not necessarily at taking on all of their risk. What customers must decide is how much they want us to do *for* them vs. how much they want us to do *with* them.

We frequently recommend that we staff projects jointly — that at least one-third of the people on the project, and sometimes more than one-half, come from the client's staff. That way, when the job is over, the client has an organization left behind that understands the system we've helped it integrate and can take over support and maintenance.

I frequently find people asking, "Will you take all of the financial risks of the job and do only one-third or one-half of the work?" That would be insane. You wouldn't do that; why should I?

We believe that a well-educated buyer is our best defense. I'd much rather deal with a savvy buyer who holds my feet to the fire than a naive buyer. The well-educated buyer and I will have a tough negotiating session, but we'll understand each other. We'll understand the fundamental economics of the business; a naive buyer doesn't necessarily understand these economics.

If we can help customers understand fundamentally how we price our work, how we manage the relationship and how we control risk on the project — and that there is no magic — then we have a positive working relationship.

You get the price negotiation behind you and get on with the work. Then we're in this together.

VINCENT LAMB
President
Computer Task Group
Scientific Systems Services
Melbourne, Fla.

Information systems managers often fail to involve users sufficiently in the formative stages of projects. In the best situations, users at all levels are involved in the planning, vendor selection, requirements definition activities and, later, in training and testing activities.

The ownership that the users feel as a result of involvement contributes enormously to the ultimate success of a systems integration project.

ED KOZEMCHAK
Director
Customer Application Engineering
AT&T
Basking Ridge, N.J.

Mistakes result from not understanding the up-front requirements of an application. Customer satisfaction is the difference between expectations and reality. If you don't get a clear set of expectations established up front, it's much easier to be disappointed or to miss having your expectations realized at the time of deployment.

One of the key stumbling blocks that systems integrators, information systems shops and end users run into has to do with the networking piece of systems integration — i.e., not fully understanding the multivendor nature of a systems integrator job.

Another obstacle is not understanding the variety of protocols — local-area, wide-area and networking requirements — and then finding out downstream that maybe the applications don't talk to one another well.

Some of our best experiences have been when we have tested the IS ideas in prototype form first. We do that in a workshop in which both the systems integrator and the customer participate.

The end user also gets an opportunity to see first-cut capabilities before the application is built and to ask questions that may pertain to a particular end-user need. Then he can further refine the application before a detailed requirements analysis is done and a requirements document is put into place.

It all comes down to customer satisfaction again. If IS believes it has satisfied end users, but three machines were left out of the picture, then it doesn't matter how well the systems integrator accomplished 95% of the job. The customer feels that the systems integrator has somehow let him down. You wind up with both an unhappy customer and an unhappy systems integrator.

GARY FERNANDES
Senior Vice-President
Electronic Data Systems Corp.
Herndon, Va.

Companies that use a systems integrator only as a means to lower IS costs are missing an opportunity to increase their competitive advantage. The right integrator can fulfill the larger role of a strategic business partner by leveraging its information technology expertise and resources, unencumbered by the overriding need to sell its own products.

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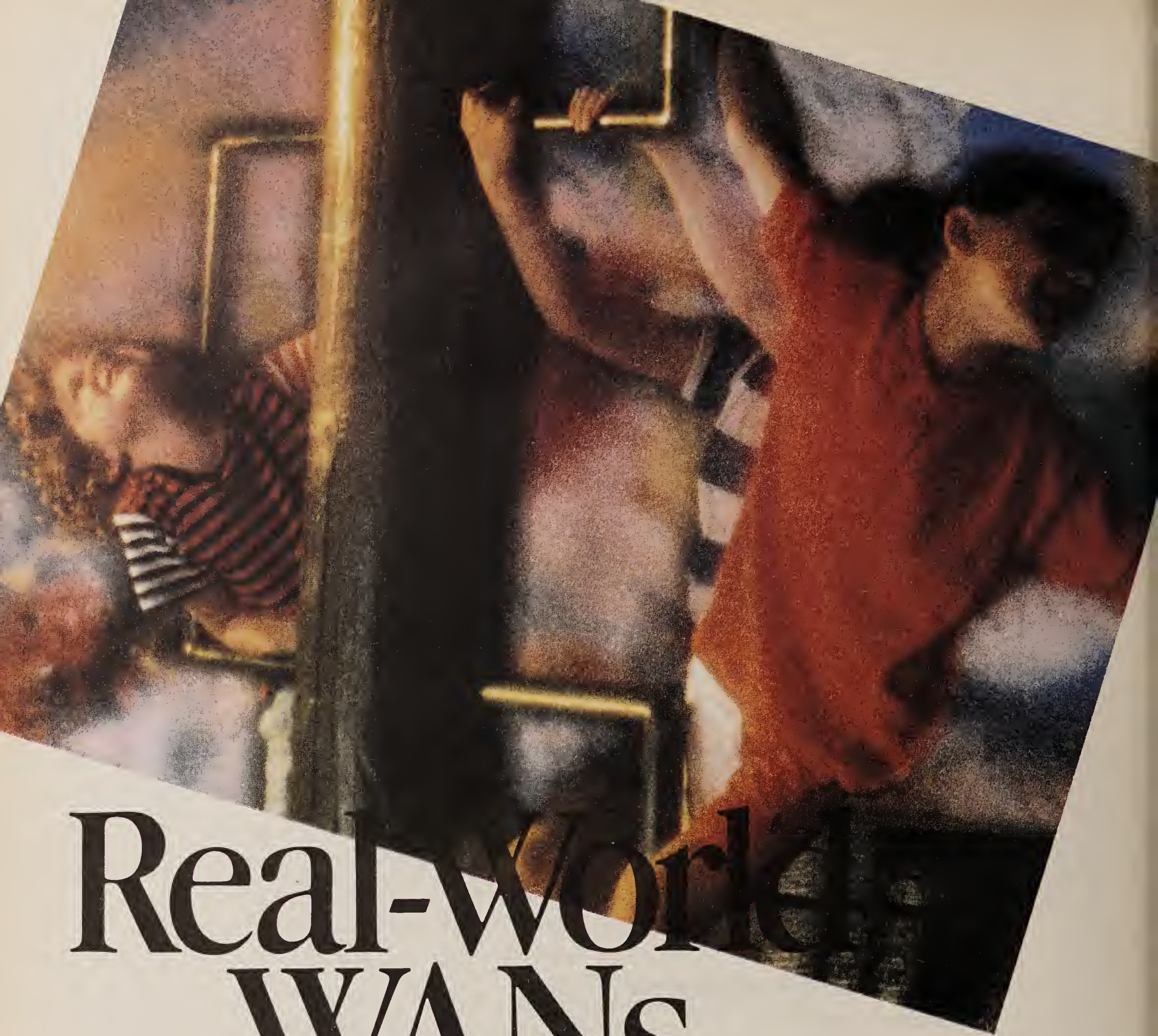

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Goulds pumps up customer service

New order entry system unites customers and divisions around the world

INTEGRATING
THE
ORGANIZATION

Goulds Pumps

BY RICHARD SAWYER

"Let's fix it before it breaks." Not the kind of attitude you'd expect from a 141-year-old company in a traditionally conservative business. But that's exactly the spirit that drove venerable Goulds Pumps, Inc. to start an organizationwide integration program. The goal? Improve customer service and boost sales by installing a worldwide order-entry and manufacturing system.

Goulds Pump wants to be known as "the easiest pump company to do business with." But slow order fulfillment and customer service were in danger of making Goulds just the opposite, and company management feared the loss of customers and new global business over the next decade.

So last year, Goulds, a $500 million industrial and consumer pump manufacturer located in Seneca Falls, N.Y., began taking a hard look at its future. It quickly identified major goals: Retain customers, speed up shipping times and increase sales through updated business practices.

The basic question top management asked was simple, says Dennis Wierzbicki, a Goulds project manager: "Where do we want to be in the '90s and the year 2000?"

Not that Goulds was suffering. Sales were growing approximately 20% a year. An estimated one in five industrial pumps and one in four home water pumps came from Goulds. And the company had an active and growing international business, which accounted for nearly one-third of sales.

However, there clearly was room for improvement. Each of Goulds' five divisions, for example, processed customer and manufacturing orders on independent, unintegrated systems.

As a result, pricing and scheduling information were often delayed. In the worst cases, a sales representative would need to place five separate orders on five systems to satisfy one customer order. To worsen matters, the company had 34 sales locations and seven international offices.

"The lack of integration greatly reduced production efficiency," Wierzbicki explains. "Without installing this latest technology, customer service would have continued to deteriorate until we eventually lost business."

To prevent customer loss before it happened, Goulds aimed high: It vowed to reduce the time needed to process orders from 10 days to one and eliminate errors; reduce invoicing lead times from 15 days to one; and find a standard, more attractive way to deliver price quotations on time to customers.

A year later, Goulds' efforts have passed from slogan to reality. The company is in the final stages of building an international order-entry system that integrates inventory, plant scheduling and shipping.

By improving cash flow, order-entry lead times, productivity and inventory handling, Goulds anticipates saving more than $2 million a year. The project is scheduled to be completed at the end of 1990.

The centralized system, based on an IBM Application System/400, processes all spare parts orders and communicates with the three other divisional machines — an IBM 3081 and two AS/400s. The customized system is based on Pansophic Systems, Inc. PM 38 software.

Currently, the system links the company's Engineered Products Division in Seneca Falls with its Slurry Pump Division in Ashland, Pa., and its Vertical Pump Division in Lubbock, Texas, and City of Industry, Calif. Goulds says the project will eventually include factory automation and distribution management modules.

Keep it simple

The first phase of the project, known as Competitive Advantage Through Simplification (CATS), was designed to track the process from customer request to order shipment from a finished goods warehouse. Company efforts were assisted by consultants from General Electric Co., Andersen Consulting, Management Dynamics, Inc. and Keane, Inc. (Compro).

Because finished goods can be used for both customer parts orders and manufacturing order demand, a real-time interface was designed to maintain the inventory balances on all machines.

Organization: Goulds Pumps, Inc.
Goal: Speed up shipping times for spare parts; expand customer base worldwide through improved service.
Strategy: Build a centralized worldwide order-entry system; establish a new 24-hour Customer Service Center.
Payoff: Shipping times reduced from 15 days to one; $2 million expected annual savings from improved productivity.

According to Wierzbicki, the custom interface enables the capture, transmission and application of data between the four machines.

This architecture enables the free flow of finished goods data on inventory balance, demand and allocation as well as permitting customer order information among the machines, he says.

To enhance customer service operation, the company created a Customer Service Center (CSC) at its Seneca Falls plant. In the past, customers had to contact the local sales offices, agents and distributors to place orders for repair parts.

Now, customers can contact the CSC directly via an 800 number and place orders or receive updated, on-line information about pricing, order status, inventory allocations and shipping schedules and pricing immediately from operators who can quickly access the computer system. Direct customer links to the system are planned for the future.

Bob Mahoney

Goulds' Wierzbicki: *Satisfy customers before problems arise*

A pretty big deal

"It's a major organizational change for us to develop this centralized customer service group," Wierzbicki says (see story page 88).

Goulds established teams of employees to talk with customers and implemented education and training programs for customers and employees. A "train-the-trainer" program has been put in place so users can teach one another.

While many pump manufacturers use integrated systems today, Wierzbicki says, Goulds is the first to take the process to the customer. The hope is that the system will fundamentally change the way customers deal with Goulds.

By the end of 1990, the new operation will process 74% of the 170,000 order transactions that Goulds' Industrial Products Group handles each year.

With the system, customers now communicate directly with the company to get lead-time quotes and scheduling information.

While the entire organization has improved its operating efficiency, a side benefit has accrued to Goulds' field sales representatives. The sales force, about 225 people including agents, distributors and manufacturers' representatives, had become used to a host of headquarters bottlenecks. Consequently, they were among the first to see positive results from the new system.

How successful has the effort been so far? "If you can expedite the processing of orders and improve your overall level of service, you benefit," says Andy Silver, vice-president at Dillon, Read and Co., a Manhattan-based investment banking firm and Goulds watcher.

"Pumps do wear out, and a substantial part of Goulds' revenues are pump maintenance and parts service. [The system] will speed the whole process immensely, generating more business for Goulds Pumps, but at less cost," Silver says.

George Fisher, a Goulds customer who frequently writes spot requisitions for pump repair parts for Du Pont Co.'s manufacturing plant in

---

Sawyer is a free-lance writer based in Weston, Mass.

Deepwater, N.J., agrees.

"I've dealt with Seneca Falls and had very good response," he says. "Any time I want parts now, it goes right through to the Customer Service Center."

Future plans

As the project progresses, Wierzbicki and his team plan to integrate additional IBM AS/400s within the U.S., Canada, Italy, West Germany and Hong Kong.

He estimates that about 15% of customer transactions (order entry, service, price requests and shipping) are being processed through the Pansophic PM/38 system. "We're taking our time due to our customers," he says. "We want to make sure they like these efficiency improvements as much as we do."

Systems development manager Gerry Schroeder says Goulds' Benton Station, Maine, facility already handles customers as far south as Washington, D.C., and west to the Ohio border. Other facilities in Baton Rouge, La., Houston, Chicago, Kansas City and Oregon are also scheduled for conversion.

"By the end of 1990, when 74% of our transaction volume will be efficiently handled with the new system, we will then simplify and automate the rest of our transactions in our new pump business," Wierzbicki explains.

Future projects include refining bills of materials (BOM) to support the entry of pump orders to the central AS/400 systems. "With BOMs installed, the process of configuring a pump's features and options will be much more complex than it is today. When this is realized, it will mark the completion of streamlining our entire distribution function," Wierzbicki says.

The final phase of the project involves converting all three divisions to a common manufacturing system, he says.

"We will simplify all operations, further automating our manufacturing plants into a totally integrated system that will include purchasing, manufacturing resource planning, production control and standard costing. This will allow us to meet every customer requirement for just-in-time deliveries on a schedule that satisfies their needs," he adds.

"The end result will be a totally integrated factory management tool that will include CAD/CAM, computer-aided engineering, robotics and just-in-time management," Wierzbicki says. "Top management will make these additional decisions over the next eight to 10 months."

Later, all three divisions' manufacturing software will be converted to the manufacturing modules. "We would have had an extremely difficult time serving each customer and meeting their requirements on a timely basis," Wierzbicki says. "Now, we've remained competitive." •

Not-so-fringe benefits

Technology has not only benefited Goulds Pumps, Inc.'s bottom line; it has also become a change agent for human resources and information systems in the company.

"Initially, almost everyone in the organization was resistant to the change associated with the integration project. Too many people were comfortable doing things the old way," says project manager Dennis Wierzbicki.

To help Goulds conduct business better and more efficiently, the company implemented a human resource plan that would push information about the project out to every part of the company. The plan consisted of the following:

- A video about the project from President and Chief Executive Officer Steve Ardia to every Goulds employee.
- Management bulletins and a project newsletter informing employees of project news — both good and bad.
- User involvement. Users participated in the design, development and testing of the system. Teams of employees talked to clients about the system. Users trained one another on how to use the system.
- Customer satisfaction surveys, which were sent out to gauge customer response to the system.

Users were not the only ones affected by change; the IS department had to be won over as well.

Goulds IS organization consists of a corporate IS group and three autonomous divisional IS organizations. "Many of the IS staff were longtime employees whose careers were built on a technology base the company was planning to remove," Wierzbicki explains.

Goulds management overcame IS resistance by paying special attention to IS individuals caught in the upheaval caused by the project. Goulds offered contracts and training programs to those whom the project would affect.

"People are starting to see the benefits of implementing new business philosophies and systems," Wierzbicki says. "They are excited by our ability to improve customer service."

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User vs. vendor: Are the scales tipping?

Computer lawyers say rulings starting to favor users

BY AMIEL KORNEL

Renee Zamic

Justice, some say, is blind. The scales she holds, however, may be tipping toward information system buyers.

According to experts in computer-related law, the growth of user vs. vendor cases is slowing. And users that do take computer and service companies to court have a better chance of winning.

"User-vendor suits still occur, but they're not nearly as significant as five years ago," says J. T. Westermeier, an attorney at Fenwick, Davis & West in Washington, D.C.

The question of who is liable for defects in information systems is at the core of many disputes pitting disgruntled users against hardware suppliers, software developers and consultants.

Recent court decisions have set precedents that could help users press their claims against vendors and consultants for defective or unsatisfactory products and services.

According to lawyers involved in such cases, sympathy for the plight of users has been growing. "The courts want to find a remedy [for user problems]," says Lawrence Chesler, general counsel for Computer Consoles, Inc., a minicomputer vendor in Rochester, N.Y. "They're thinking, 'Aw, the poor user.' "

Edward Saltzberg, a lawyer at Warner and Stackpole in Boston and editor of the "Computer Law Newsletter," agrees that the legal climate is warming up for users. As an example, he cites a recent decision by the Massachusetts Appeals Court.

In the case of Arthur D. Little Systems (ADLS), a now-defunct systems integration subsidiary of the Cambridge, Mass., management consultancy, was found to have breached contractual obligations to a client.

Legal experts say the case is significant because the court ruled in favor of the user, even though ADLS was found largely innocent of wrongdoing and United Shoe Machinery was clearly computer-savvy.

In the past, users wishing to sue vendors often found the courtroom an inhospitable place. One explanation is that the Uniform Commercial Code, the legal framework for much liability litigation, "is very pro-vendor," says Lee Gesmer, a lawyer at Lucash, Gesmer and Updegrove in Boston, because it allows suppliers to limit their liability.

Experts say there are several reasons for the slowdown in user-vendor litigation:

- **More complex distribution channels.** As systems and distribution channels become more complex, assigning legal responsibility becomes more nettlesome. This has helped slow the growth in computer-related litigation, lawyers say.
- **Cheaper, more reliable hardware.** Lawyers specializing in technology-related issues note that hardware is less expensive and more reliable than in past years.

As a result, users have less reason — and less incentive — to bring lawsuits against hardware vendors. If a personal computer proves shoddy, for instance, it can be cheaper to junk it and buy another than to get bogged down in legal wrangles.

"Litigation is not cost-effective in the PC area," says Daniel Brooks, an attorney at Cadwalader, Wickersham & Taft in Washington, D.C.

- **Software, services are hotter.** More disputes during the past two years target alleged defects in software and services, a thornier legal terrain than hardware complaints. "The focus of these cases has shifted from product liability to the software that guides" the systems, says Howard Zaharoff, a lawyer at Brown, Rudnick, Freed & Gesmer in Boston.
- **Vendors nip problems in the bud.** In addition, computer and service vendors have become more sophisticated about putting out the legal brush fires as soon as potential problems with users begin to flare.

"Smart vendors are able to spot disappointed users and do something about it instead of letting the problem fester," says Laurence Reece, a lawyer at Heidlage and Reece in Boston.

"Manufacturers have finally realized that they are better off keeping the customer and settling the case," says Robert Bigelow, a Winchester, Mass., attorney who wrote

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Kornel is a *Computerworld* senior editor, features.

- **More cases handled outside of court**
- **Vendors are eager to settle quickly**
- **Courts say: 'The poor user!'**

some of the earliest books and articles about computer-related law.

Vendors hope to avoid the negative publicity caused by a trial, lawyers say.

- **Rise in out-of-court settlements.** Another new development is that the vast majority of user-vendor disputes are now resolved without litigation.

More cases are being settled by arbitration and other dispute-resolution methods. According to the American Arbitration Association, a nonprofit group in Washington, D.C., the dollar value has risen in computer-related cases handled through arbitration in recent years. In 1989, the association handled 165 cases seeking claims and counterclaims worth more than $80 million. Two years earlier, the value of claims the group handled totaled $45 million.

- **Fear of large awards.** Lawyers note that growth in the size of awards in liability cases handled in court is leading vendors to settle more quickly and readily.

For example, a California trial jury is currently hearing testimony about whether to uphold a record-breaking $48.3 million award granted last December to a computer system user alleging breach of warranty.

In the case, Seismograph Service Corp., a Tulsa, Okla.-based software and services subsidiary of Raytheon Co., was found liable for selling 12 defective computer systems in 1981 to Geophysical Systems Corp., a California oil and gas exploration company. Geophysical alleged that faulty hardware and software caused it to go bankrupt [CW, March 26].

Signs of hope

Legal experts say that users who do choose to take their cases to court now have a better chance of winning.

In the ADLS case, for example, United Shoe Machinery successfully argued that the response times of terminals on the material control and accounting system installed by ADLS were slower than promised.

Experts say the case is significant because ADLS lost despite having "reasonably relied" on assurances from system supplier Data General Corp. that its C-330 minicomputer could handle the job. (A spokesman for ADLS, noting that the court has not yet determined damages, says the firm has no plans to sue DG.)

Despite such recent successes, lawyers warn that computer suits brought against vendors for breach of contract or warranty still are hard to win.

To improve their chances, some users try accusing vendors of fraud and misrepresentation. Legal decisions in recent years suggest that the courts are getting tougher with suppliers that inflate buyer expectations.

"There is more sympathy for users following the courts' experience with the unscrupulous sales practices of some vendors," Saltzberg says.

The New York District Court ruled in February that NEC Home Electronics, Inc. falsely advertised that a new color video monitor was "fully compatible" with IBM's Video Graphics Array (VGA) standard.

According to New York attorney Alan Reitzfeld of Haight, Gardner, Poor & Havens, the court found that although the monitor could display VGA graphics, it was technically incompatible because it "often required manual readjustments to prevent screen rolling and image compression" when displaying graphics prepared on a true VGA system. Although the lawsuit was brought by a competing video monitor vendor, Princeton Graphics Operating LP, lawyers say the decision could help users in their fight to keep suppliers' advertising honest. "The suits

When computerized disaster strikes

Recent cases suggest that IS can find itself in the hot seat when things go wrong

BY AMIEL KORNEL

In June 1985, Caty Yarbrough — then a 63-year-old patient undergoing radiation treatment at the Kennestone Regional Oncology Center in Marietta, Ga. — mistakenly received two bursts of radiation that were 125 times greater than prescribed.

The 25,000 rads from each of those two pulses burned a hole in Yarbrough's chest, destroyed a nerve serving her left hand and resulted in her needing a mastectomy, according to her lawyer, Bill Bird.

The error was reportedly traced to a software bug in the hospital's Therac 25 radiation device, developed by Atomic Energy of Canada Ltd. in Ottawa. The Digital Equipment Corp. PDP-11-driven Therac 25 X-ray unit was implicated at the time in several other incidents in which patients received excessive doses of radiation, at least one of which resulted in the death of the patient.

Besides suing the system vendor, Yarbrough sued both the hospital and a physician. Bird, currently an attorney in Atlanta, says Yarbrough accused the hospital of negligence because the medical technician disregarded user manuals and delivered a second injurious burst of radiation even though the system had indicated an error after the first occurred.

Although the court never made a decision about liability, all three defendants contributed to an out-of-court settlement, according to Bird.

While it is an extreme example, the X-ray incident — a well-known case in legal circles — raises a chilling question: Can IS be held responsible when defects in an information system harm individuals or property?

Increasingly, the answer seems to be "maybe."

IS not automatically exempt

Today, courts are more likely than in the past to be called on to assign liability in cases in which computers cause damage.

Because the development and implementation of computer systems can involve a wide cast of characters — consultants, software designers, programmers, hardware vendors, distributors and users themselves — assigning responsibility when something goes awry can resemble a high-tech whodunit. But IS is high on the list of suspects.

While the courts seem more willing than before to blame vendors of computer products and services, experts say that IS personnel in user companies should not automatically assume they are safe from liability claims. As custodians of their companies' information processing resources, IS executives may be held accountable for failures of the systems they manage.

"Professionals can always be held liable for damage caused by their tools, [even] if their tools are faulty," says Kevin Ashley, University of Pittsburgh Law School professor. "The same can be said of users of computer systems."

Courts are also more likely to see computer professionals as possessing a set of skills that makes them accountable for damages caused by systems they implement and operate, according to legal scholars, lawyers and recent court decisions.

IS professionals needn't worry that they may end up in jail, however. Legal experts say that IS personnel are unlikely to be found personally guilty of wrongdoing if a system they manage causes damages. The reason is that plaintiffs in lawsuits generally press their claims against the parties with the deepest pockets. That means going after the IS user company or the vendor of the faulty systems.

Tom Monahan

"The IS executive is not individually liable, but he could lose his job," says J. T. Westermeier, a lawyer at Fenwick, Davis & West in Washington, D.C.

Moreover, legal experts say that the question of IS liability probably will become even more important in coming years, thanks to the growing use of expert systems. Such systems are likely to increase the number of computer-based applications used in situations in which lives and property could be endangered, specialists say.

"With the ubiquitous nature of IS, the possibilities for personal injury are growing," says Laurence Reece, a lawyer at Heidlage and Reece in Boston.

Doctors, lawyers and engineers are just some of the professionals who are starting to rely on computers in decision-making. The list of mission-critical computer applications that could have catastrophic consequences in the event of system defects is also growing: Air traffic control, aircraft flight guidance systems and nuclear power plant management are but a few.

"Computer systems are aids, not substitutes for professional judgment," says Gregory Moore at Boston-based law firm Ropes & Gray.

Firms or individuals often buy expert systems to provide an expertise that they lack. Such users must be careful, however, not to be lulled into overconfidence in the accuracy of the systems, lawyers warn. Ultimately, the end user and the IS organization must take responsibility for professional judgments and actions.

A survey of technology-related jurisprudence suggests that defendants can be damned for using information systems and damned if they don't. Courts at all levels of the judicial system have found users liable for both overreliance on technology as well as for not using it enough.

Court decisions dealing with improper use of technology date as far back as 1932, when U.S. Judge Learned Hand made a landmark decision by finding a tugboat company guilty of negligence for not having equipped their boats with radio receivers.

The plaintiffs sued the tugboat company for damages after coal and barges they owned sunk in a storm while being towed by the tugs. Had the two tugs been equipped with radios, Hand said, their captains would have heard weather reports warning of a rapidly approaching gale and taken protective measures.

The implication of this decision, says Boston attorney Howard Zaharoff from Brown, Rudnick, Freed & Gesmer, is that an individual can be found guilty of negligence for not using technology that would have helped avoid damages or injuries. Since then, however, courts have yet to issue rulings that would clearly invoke this principle regarding computer use.

Improper reliance on technology has also been condemned by the courts. In *Ford Motor Credit Co.* v. *Swarens*, Ford was found by the Kentucky Appellate Court in 1969 to have wrongfully repossessed the buyer's car after its computer indicated he had not paid his bills.

A Ford agent had forgotten to enter information concerning the customer's payments into the company's system. The court rejected Ford's arguments that they had reasonably relied on the computer in making their decision to repossess the car.

Credit bureau errors have led to other lawsuits as well. In *Dun & Bradstreet, Inc.* v. *Greenmoss Builders, Inc.*, the U.S. Supreme court in 1985 upheld a verdict in favor of a Vermont construction contractor who had sued a credit reporting agency for defamation. Because of an input error, the agency had circulated a false report stating that the contractor had filed for bankruptcy. •

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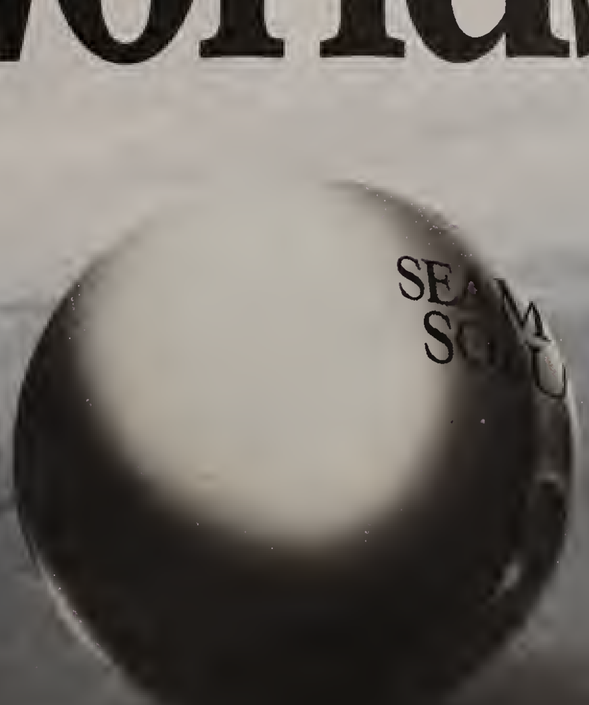

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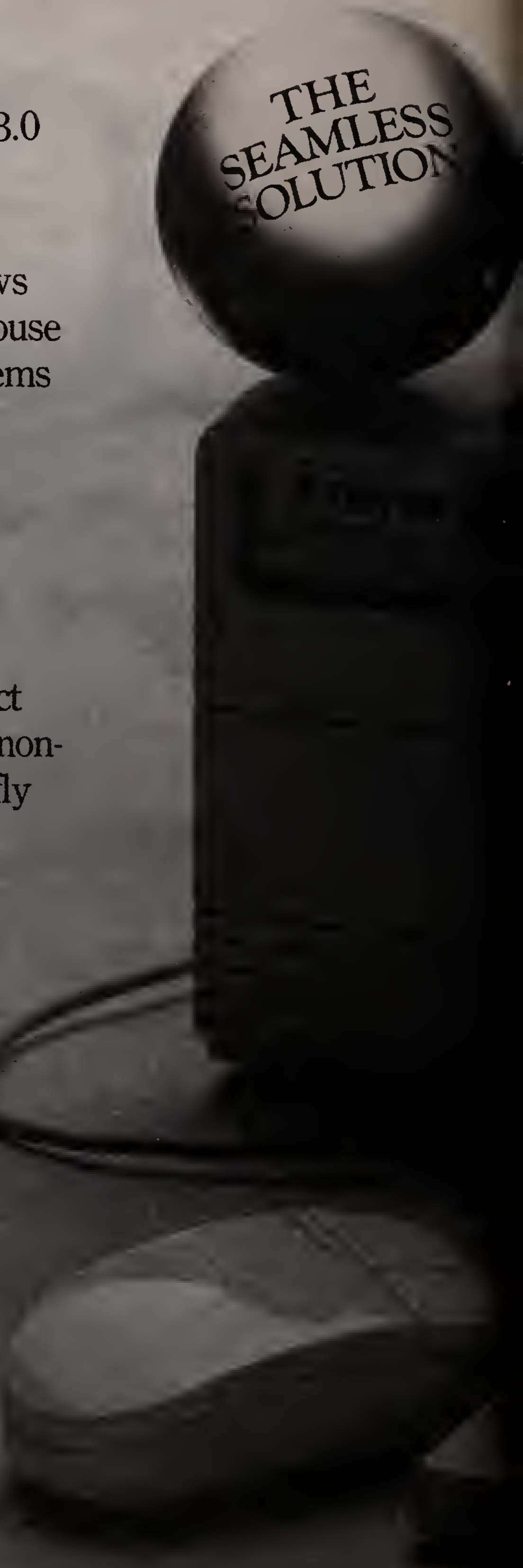

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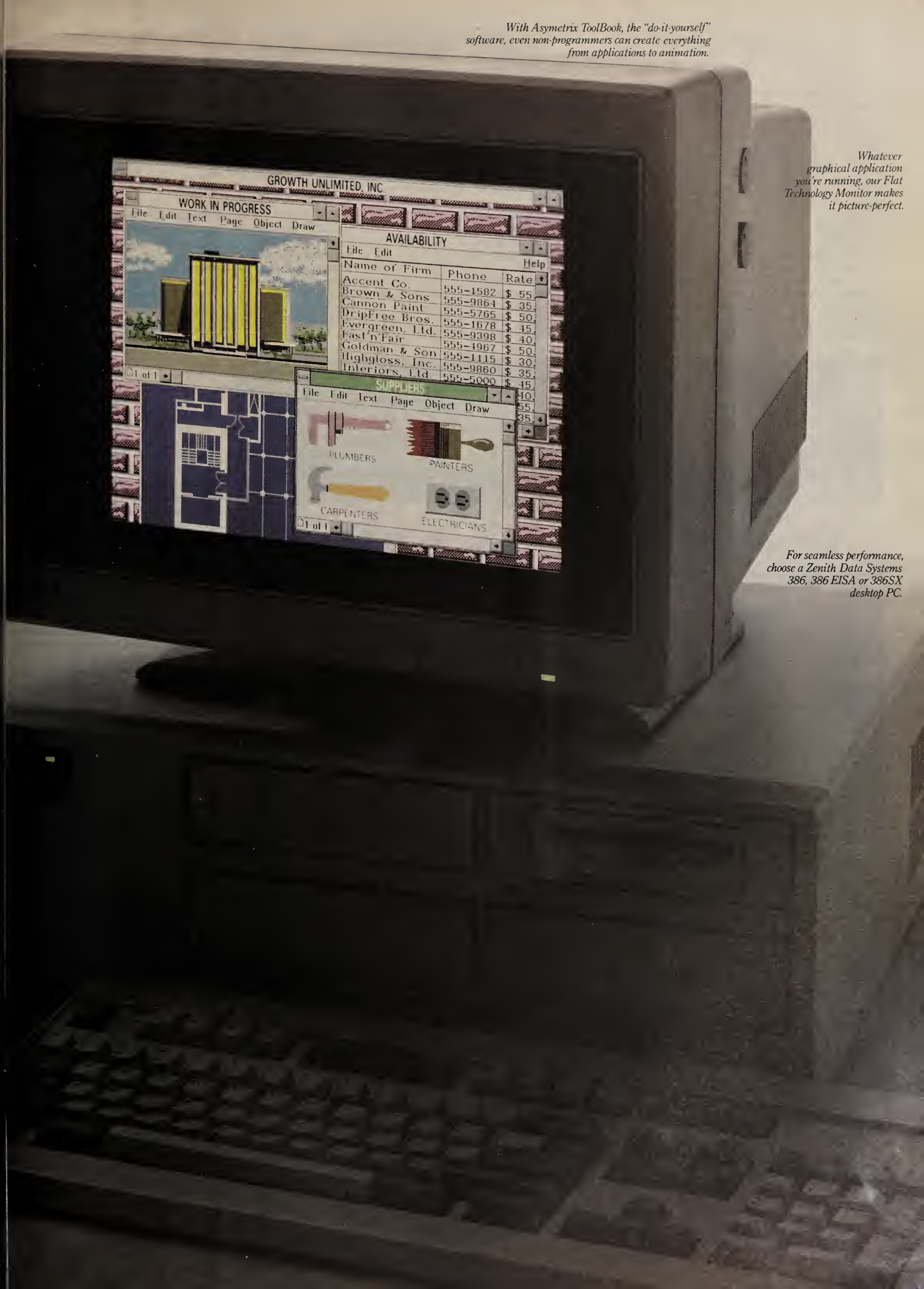

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have led vendors to be somewhat more responsible in what they say they can sell," Zaharoff says.

Users should also be heartened by a 1989 case pitting Diversified Graphics Ltd., an apparel manufacturer, against Ernst & Whinney, the accounting and consulting firm that later became Ernst & Young. Diversified Graphics sued Ernst & Whinney, alleging that it had hired the consultants to select and implement an information system that would satisfy its data processing requirements.

Faced with complaints that the system failed to meet the client's needs, Ernst & Whinney maintained that it had acted only in an advisory role. It argued that subsequent difficulties were because of unwise decisions made by Diversified Graphics' management staff.

On appeal, the 8th Circuit Federal Court upheld the jury's verdict in favor of Diversified Graphics. Citing the consultants' "superior knowledge and expertise in the area of computer systems," the court found that "Ernst & Whinney was properly held to a professional standard of care."

Lawyers specializing in computer-related issues say the Diversified Graphics case builds on a 1986 decision and could serve as a precedent for holding consultants and software developers to a so-called professional — rather than ordinary — standard of care when determining claims of negligence.

The Diversified Graphics decision is seen by many lawyers as having set the stage for a new area of liability that could be called computer malpractice.

As a result, some speculate that computer service providers — such as consultants and software developers — may be held to higher standards in the near future. This in turn could make it easier for customers to prove negligence against them. In such a scenario, these computer professionals could face liability claims similar to those now made against lawyers, doctors, architects and engineers.

Moreover, several federal agencies — the Food and Drug Administration, the Securities and Exchange Commission and the Internal Revenue Service — have passed, or are considering, regulations making a software author legally liable for errors caused by defective code.

The IRS, for instance, issued a ruling in 1986 holding that the author of a software program used in preparing taxes could be held liable as a tax preparer.

Experts say this and other recent actions should give unhappy users a fighting chance in their legal battles against providers of IS products and services.

Don't get too cocky

Even with recent successes, lawyers say that vendors remain formidable foes. Over the years, vendors have become adept at drafting contracts that are heavily stacked in their favor and leave little recourse for unhappy buyers. "If the user is limited to contractual or limit-of-warranty arguments, they're often going to lose," Reece warns. "Vendors' boilerplate contracts will cut you off at the knees."

Some lawyers are downright pessimistic. "For users, the picture is even more bleak than before because vendors have become so smart in writing contracts," Gesmer says.

IBM, in particular, has been successful at avoiding court disputes, lawyers say. Aside from occasional antitrust allegations, the company is rarely named in lawsuits. Their contracts are cited by lawyers as models for limiting liability.

An example: In a 1985 Louisiana district court case, Datamatic, Inc. sought damages against IBM for equipment bought through a leasing company.

The user charged that the equipment malfunctioned continuously for eight years because of what was later discovered to be a "manufacturer's defect."

While the court found that Datamatic was indeed entitled to bring suit directly against IBM, rather than the firm that sold it the system, the court also said IBM was not liable since its contract with the lessor limited such claims.

Software companies have also limited their liability for damages caused by defects in programs they develop. "The software industry has been getting away with murder for a long time," says Albert Case, a consultant at Stamford, Conn.-based Gartner Group, Inc. Most often, standard contracts and warranties state that the vendor cannot be made to pay damages greater than the price of the software.

Borland International's limited warranty, which is typical of those offered by other software companies, specifies that its liability "shall be limited to replacement of defective disk(s) or documentation and shall not include or extend to any claim for or right to recover any other damages."

Caveat emptor still holds

Apparent gains by users also do not mean that the old warning *caveat emptor*, or buyer beware, ceases to apply.

The point was driven home in a case settled in Northern Illinois last December. In *Herbert Friedman & Associates, Inc.* v. *Lifetime Doors, Inc.*, the court said that while Friedman made unrealistic promises about the software it contracted to deliver, "many of Lifetime's complaints arise from the misconception of what it purchased, rather than defective workmanship by Friedman."

As a result, the court rejected the door manufacturer's claims of fraud and negligent misrepresentation. Buyers, the courts seem to be saying, should have a clear understanding of what they are getting from a supplier. ●

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NATIONAL BRIEFS

Twin peeks

In line with the new openness that is turning the Soviet Union into a promised land for U.S.-based computer vendors, **Control Data Corp.** (CDC) — currently contracting to sell six Cyber computers to increase safety in Soviet power plants — celebrated Soviet President Mikhail Gorbachev's visit last week by opening its Bloomington, Minn., demonstration center and its Arden Hills, Minn., manufacturing plant to the press for one day. The open houses, CDC said, were aimed at full disclosure of what it was the Soviets were buying.

……

Everything's coming up Bose's

Two years ago, the International Olympic Committee designated Framingham, Mass.-based **Bose Corp.** the first official sound system supplier to the Olympic Games. Now, with February 1992 looming into view, the committee has ruled that the firm most likely to equal or better Bose's 1988 performance in Calgary, Alberta, is — Bose. Under an agreement announced last month, Bose will handle all acoustics for the XVI Winter Olympics in Albertville, France.

'Comrades, we were born to code'

Absence of hardware makes Soviet programming skills grow stronger

Second in a two-part series

BY PATRICIA KEEFE
CW STAFF

Despite an insatiable hunger for computer hardware, it's the emerging Soviet software market that holds the greatest promise, both for the cash-starved Soviets and for their Western business partners.

AST's *Qureshey encountered computer-literate Soviets*

U.S. vendors have nothing but the highest of praise for Soviet programmers. "They can sling code with the best of them," marvelled Larry Heimendinger, chief executive officer at Nantucket Corp.

"Soviet programmers know how to make the best use of limited resources, which is why they are writing excellent code," added Maciek Brzeski, international marketing manager at AST Research, Inc. Company President Safi U. Qureshey said Soviets are very computer-literate.

Just as the Soviet way of doing business is far different than it is in the U.S. (see story page 103), the Soviet software segment is a different world. Western respect is largely based on astonishing feats of reverse-engineering typically executed on primitive hardware.

"Our [Soviet] programmers are excited just to work on a 286 system with a megabyte of RAM and a 40M-byte hard drive," said Scott Klososky, first deputy director at Paragraph, a joint software venture with the Soviet Academy of Sciences.

Also, the Soviet approach to programming comes not from the hacker realm, but instead is much more methodology-oriented, said Helen Charov, president of Charov Associates, a Moodus, Conn.-based international consulting firm. "They devise elaborate tables on paper before they ever sit down to write code," she explained.

Moreover, many observers noted that Soviet youths have fewer material distractions than do their U.S. counterparts and tend to treat programming as a welcome game.

At Comtek '90, a trade show held in Moscow last March, Soviet youngsters thronged the booths looking for any opportunity to program, Brzeski said. "Typing with English-language keyboards, they wrote programs and took home the results on their own diskettes. They were programming from memory in Basic." Added AST's Joel Don, "They may be behind us in time, but intellectually, they are with us."

That same thought is occurring with growing frequency to other developers. Ashton-Tate Corp., for example, is marketing westward a Soviet-developed add-in to its Framework tool. "Their chief software designer couldn't believe what was achieved by someone with no knowledge of the internal workings of the program," Don said.

Paragraph, a two-year-old concern, had the idea to use Soviet brainpower and license the ensuing technology to the West. "We have taken the best Soviet programmers in Moscow and formed a company," Klososky said.

Beyond extensions to popular Western packages and vertical software targeted to specific industrial needs, the Soviets are

Continued on page 99

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Smithsonian opens an 'Information Age' exhibit

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — For years to come, hordes of sixth-graders and other tourists will be able to explore the ways in which information technology has changed the American way of life at the Smithsonian Institution's "Information Age" exhibit, which opened last month.

The exhibition — once only a gleam in the eye of IBM Chairman John Akers — is a lively, eye-opening chronicle of the rise of the computer and telecommunications industries.

Besides the usual computer artifacts, the multimedia gallery ushers in a new era of museum exhibition with a panoply of videodisc presentations and touch-screen stations that let people interact with the technology, according to chief curator David Allison.

For example, visitors can carry a bar-coded brochure, have it scanned at each interactive station and walk out with a laser-printed record of their experience. In addition, they can sample on-line information services, engage in currency trading at a workstation and try their hand at a computer-aided design of a bicycle.

"Information Age" is the most ambitious exhibition ever presented at the Smithsonian, according to Roger Kennedy, director of the National Museum of American History, where the 14,000 sq-ft exhibit will continue indefinitely.

Behind the scenes is a local-area network connecting the interactive stations and various rack-mounted computers in a control room run by Electronic Data Systems Corp. (EDS), the exhibit's systems integrator.

Vendor lender

The $10 million exhibit was made possible by donations of equipment, money and services from numerous vendors, including IBM, EDS, the regional Bell holding companies, Digital Equipment Corp., Apple Computer, Inc., NCR Corp. and Ungermann-Bass, Inc., a unit of Tandem Computers, Inc.

One major technical challenge was simply making sure that all of the donated equipment was integrated into the system, according to Larry Lozon, EDS technical team leader for the exhibit.

Another challenge was hiding 10 miles of cabling in the ceiling and custom-made raised floor, he said.

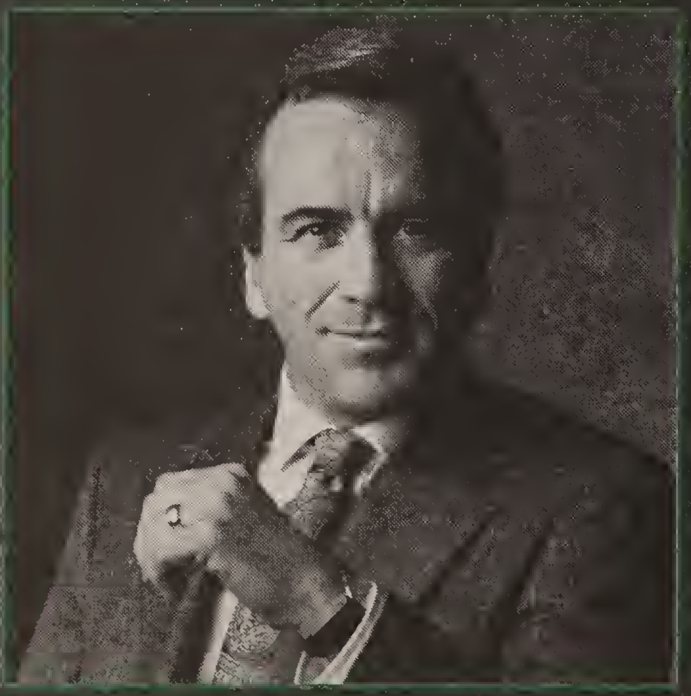
EDS used a client/server architecture, with some of the touch screens as far as 300 feet away from the processors. "We even have touch screens connected to Vaxstation 3100s, which wouldn't ordinarily have touch screens. Now that was a challenge," Lozon said.

The gallery includes such computer artifacts as the Hollerith tabulating machine used for the 1890 census; the early computers Electronic Numeric Integrator and Calculator, or ENIAC, and Univac I; the popular IBM 650 of the 1950s, which used about 500 vacuum tubes and a magnetic drum for memory; DEC's PDP-8 minicomputer from 1965; and the wood-covered Apple I microcomputer built by Steve Jobs and Steve Wozniak in 1976.

The exhibit covers radio and television history as well, on the grounds that the "Information Age" combines the computer age and the media age.

For example, the exhibit notes that many Americans got their first glimpse of a computer on television in November 1952, when CBS newsman Walter Cronkite announced that the Univac I predicted Dwight Eisenhower would win the presidential election by a landslide.

Robert Adams, secretary of the Smithsonian, stressed that the exhibit will change as new technologies and issues emerge. He added that the exhibit may need to pay more attention to such topics as hackers and privacy in the computer age.



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Soviets

CONTINUED FROM PAGE 95

said to have a great deal of expertise in expert systems, artificial intelligence and voice-pattern and text-pattern recognition.

Even better, these fabled skills come cheap, Charov pointed out. Klososky estimated that top Soviet programmers make about 1,200 rubles per month, which translates into anywhere from $1,920 to several hundred dollars per month, depending on the exchange rate used. In the U.S., top programmers can make up to $9,000 per month.

"Soviet programmers cost one-twentieth of their Western counterparts. This lets you speculate on software development, something most U.S. software companies wouldn't dream of doing," Charov said.

She envisions the development of a cottage software industry doing contract programming for Western developers. "We're not looking at 'What have you developed that I can sell over here,' but rather, 'Here are the kinds of product we think will need development, and here are the kinds of capabilities that you should be developing as programmers,' " she said.

The Soviets seem open to such overtures, but the desire to reap hard currency profits from software sales has forced the Soviets to take a sobering look at the rampant piracy that infests the country.

Klososky said that Soviet piracy is exacerbated by Western developers who insist on hard currency: "The Soviets just don't have the hard currency to spend, so they don't have any choice if they want it bad enough. They are going to buy one package and copy it 99 times."

Soviet students *flock to see U.S. hardware and software at the Comtek '90 trade show in Moscow*

Piracy paved the way

Back in the USSR, they may not know how lucky they are. Soviet users just might be surprised to learn that some of their desktop standards mirror our own. A number of U.S. software vendors certainly were.

Several decided to enter the market only after stumbling upon loyal, pirated colonies of their software.

"The Russians are brand-loyal. If you are there and you don't screw them, you can become a big player," said Peter Liljegren, director of Oracle Systems Corp.'s Eastern European efforts.

Western packages that have achieved a Soviet following of sorts include Autodesk, Inc.'s Autocad, Ashton-Tate Corp.'s Dbase, Nantucket Software Corp.'s Clipper, Oracle's Oracle, Microsoft Corp.'s MS-DOS and Peter Norton Computing, Inc.'s Norton Commander.

Nantucket President Larry Heimendinger estimated that Soviets are using between 15,000 and 20,000 pirated copies of Clipper. A Microamerica, Inc. spokesman quipped that "to Peter Norton's knowledge, they haven't sold a single package over there."

Although the typical personal computer is an IBM Personal Computer AT- or XT-compatible, "it's crazy to think the [Intel Corp. 80386 chip] is new technology to the Soviets," said Michael Tseytin, a Soviet emigre who owns Computerland Moscow.

MS-DOS, or its Soviet-written knockoff called Alpha-DOS, rules the day and the desktop. Microsoft is hoping to cement that hold with its recent release of a Cyrillic version of DOS.

Unix tops the list of what you *won't* find. "Soviets don't understand; they are always asking, 'Why do you need another operating system?' " said Peter Alexander, a principal at Glav-PC, which specializes in joint ventures with Soviet organizations. Of course, Unix is used for scientific computing that tends to be done on computers such as Russian clones of Digital Equipment Corp. VAXs and IBM System/36s and 38s.

Despite Apple Computer, Inc. Chairman John Sculley's highly publicized gift of an Apple IIGS to Soviet President Mikhail Gorbachev, the only Mac that is big in Moscow is the "Bolshoi Mac," otherwise known as the McDonald's "Big Mac."

If the West finds the Macintosh somewhat on the expensive side and too high-end-oriented, imagine the cash-poor Soviets' reaction.

The "computer for the people" is a little too bourgeois for Soviet wallets, Soviet experts said. Nor is there much demand for spreadsheets or word processing, but there is interest in desktop publishing, databases and development languages.

PATRICIA KEEFE

Glav-PC's Alexander

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INDUSTRY

INSIGHT

Patricia Keefe

Can't we still be friends?

Two months ago, Andre Peterson, a vice-president at Wordperfect, assured his neighbors at Novell that they had no reason to worry about the yuppie crowd at Lotus.

Following the eleventh-hour stalemate in the now-purged merger between Lotus and Novell, it looks like Peterson advised the wrong group.

Longtime Novell rival 3Com must be feeling at least some sense of satisfaction. After all, the undisputed model of rejected suitordom has spent enough time standing alone at the altar while rival Novell has raced repeatedly through the rice gauntlet.

Those who never could find any compelling synergy between the network software leader and the spreadsheet kingpin — no matter how hard the lovebirds tried to explain — also feel some vindication.

Some Novell shareholders, meanwhile, are probably overcome with relief. Lotus Chief Executive Officer Jim Manzi is adamant that Novell shareholders did not put the whammy on this deal. They may not have been the instrument, but they certainly provided impetus.

Consider that in the week following the dissolution of merger talks, Novell stock rocketed nine points. But when the engagement was announced, Novell stock dropped at least five points. Now *someone* was having problems swallowing this match.

If, as sources close to Novell suggest, Novell CEO Ray Noorda's typically lackadaisical "can do alone" approach backfired this once, then he might have been better off going back to Lotus and coming clean. Instead, Noorda did what he does well — danced around the issue. He was still ducking and weaving at the post-breakup press teleconference.

Perhaps the strongest indicators that this coupling was not quite the meeting of the minds that Novell and Lotus said it would be are the contrasting versions of events given by both firms. Noorda says he's not holding his breath but is leaving the door open to renewed negotiations, all the while bubbling about what a gentleman Manzi is and how some joint marketing efforts already under way will continue to go forward.

Switching channels, we catch Manzi's viewpoint: The merger is dead as a doornail, thanks to some "bad faith" negotiating by Noorda. There are no joint activities in progress and no decision has been made as to whether any such plans will proceed. Quite frankly, he still doesn't know why Novell got cold feet.

No synergy here, obviously.

However, although Noorda is taking most of the rap for the breakup of what might have been an intriguing combination, Manzi does not escape unscathed.

Either the usually sharp Manzi was suckered by Noorda, or he got caught pulling a power play of his own, some observers say.

"A lot of people thought the Lotus merger was Ray Noorda's exit papers," points out Craig Burton, publisher of the "Clarke Burton Report" and formerly Noorda's right-hand man.

Regardless, a now-wary Manzi will probably grit his teeth so that the two companies can continue to transact business. Lotus needs Novell's networking and systems integration expertise and resellers.

Ironically, we may see the two companies accomplish via alliance everything they said they needed to merge to do. What we probably won't see, though, is any lasting impact on the software landscape. Much of Microsoft's dominance comes from desktop operating systems and environments, two key areas that neither Novell nor Lotus competes in.

Keefe is *Computerworld's* senior editor, PCs and workstations.

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Texas Instruments hews to its patent protection promises

BY MAURA J. HARRINGTON
CW STAFF

As promised four years ago by Texas Instruments, Inc. Executive Vice-President Pat Weber, TI has taken action — to the tune of about $570 million of cumulative royalty revenues since 1986 — to protect its intellectual property and to increase the return on the company's research and development investments.

While most of TI's patent protection actions have focused on the firms's dynamic random-access memory and Japanese patents, lately TI has been quietly supplying its legal shop with personal computer-clone and peripheral vendor names to go after for return on eight basic microcomputer system patents it has held since the late 1970s and early 1980s.

The results of this most recent intellectual property protection campaign could cost vendors millions of dollars and possibly have an effect on the computer and peripherals market in terms of end-user costs in the future, according to Rick Wittington, a semiconductor analyst at Kidder, Peabody & Co. in New York.

As for the effect TI could have on the price of PCs and peripherals, the opinion is mixed.

Some analysts claimed that royalty payments, typically between 1% and 3%, will have no effect on pricing of PCs and peripherals because the competition in these markets is too heated. Others, however, believe that the returns on such products are too low already, and that the degree of aggressiveness with which TI pursues patent violators will determine other vendors' future pricing strategies.

So far, TI's protection of its microprocessor systems patents has translated into 80% of the $35 million the company collected in royalty fees for the first quarter of 1990, according to the company. And that is just the tip of the iceberg, said chief patent counsel Mel Sharp.

Dallas-based Tandy Corp. was the first U.S.-based company that agreed to pay royalty fees for the TI microcomputer systems patent rights. In April, Tandy agreed to pay TI a 2.5% fee for all of its products in violation of the microprocessor systems patents made after June 30, 1989.

Others on TI's violation hit list could include manufacturers of keyboards, graphics boards, monitors, modems and facsimile boards as well as PC-clone and printer vendors, according to TI.

TI claims that the vendors are in violation of eight different patents included in TI's microcomputer systems portfolio. These patents are defined as "basic microprocessor patents . . . which relate to the way microprocessor-based systems interact with the I/O functions of PCs and peripherals," a TI spokeswoman said.

For example, one patent pertains to the part of the microprocessor that scans the keyboard when pressure is applied to it, to determine which key was pressed. Two others cover the way in which the CPU interfaces with the peripherals to turn them on and off, the spokeswoman said.

Directive still applies

Weber's 1986 directive still applies, she said. "TI has invested a lot over the years in R&D, and we have a policy to protect our investment. . . . We believe that our systems patents are widely utilized by system and peripherals vendors, and it is our policy to earn a fair return on our intellectual property."

While TI aims at getting a return from the major PC and printer vendors right now, if the company has the resources, it will approach all the vendors that it sees as being in violation of its patents, Sharp said.

"Since mid-1989, we have put 20-plus [PCs and printer vendors] on notice of our patents, and we've been in discussion since then to reach agreements," he said. "We will continue to protect our intellectual properties" until all licensing agreements have been issued.

The agreements, analysts said, mean more than just money. "The reality is that there is going to be a lot of horse trading going on. . . . What TI is trying to do is to improve its competitive position, along with increasing its income," said David Garcia, an industry analyst at New Orleans-based Howard, Weil Financial Corp.

Horse trading is no small business, either, said William Milton of New York-based Brown Brothers Harriman & Co. In a year, Milton said, TI could earn up to $200 million in royalty fees alone.

"This patent situation puts TI in a better position" to gain leverage to get several cross-licensing agreements, said John Geraghty, an analyst at The First Boston Corp. in New York.

Extra! Software slowdown speeds up

WASHINGTON, D.C. — As of last week, it's official: The software industry slowdown is history. This upbeat news byte comes to you courtesy of the Software Publishers Association (SPA). The 650-member personal computer software industry trade group drew its conclusion from an Arthur Andersen & Co. survey of monthly sales figures from 150 prominent U.S.-based software firms. These figures showed sales for the first quarter of 1990 at some $993 million, up 25.5% from sales in last year's comparable period. International sales rose 50%.

Among the quarter's biggest boomers, according to the Andersen survey, were word processors, which rocketed 88% to $117 million, and MS-DOS education software, sales of which increased 108% on a year-to-year quarterly comparison. The SPA, said research director Ann Stephens, was shocked, if pleasantly: First quarter, she said, is traditionally a slow period in the software sector. The association credited this year's refreshing departure from that trend to such factors as a strong wave of new products and new releases and the SPA's aggressive and widely publicized campaign against software piracy both at home and abroad.

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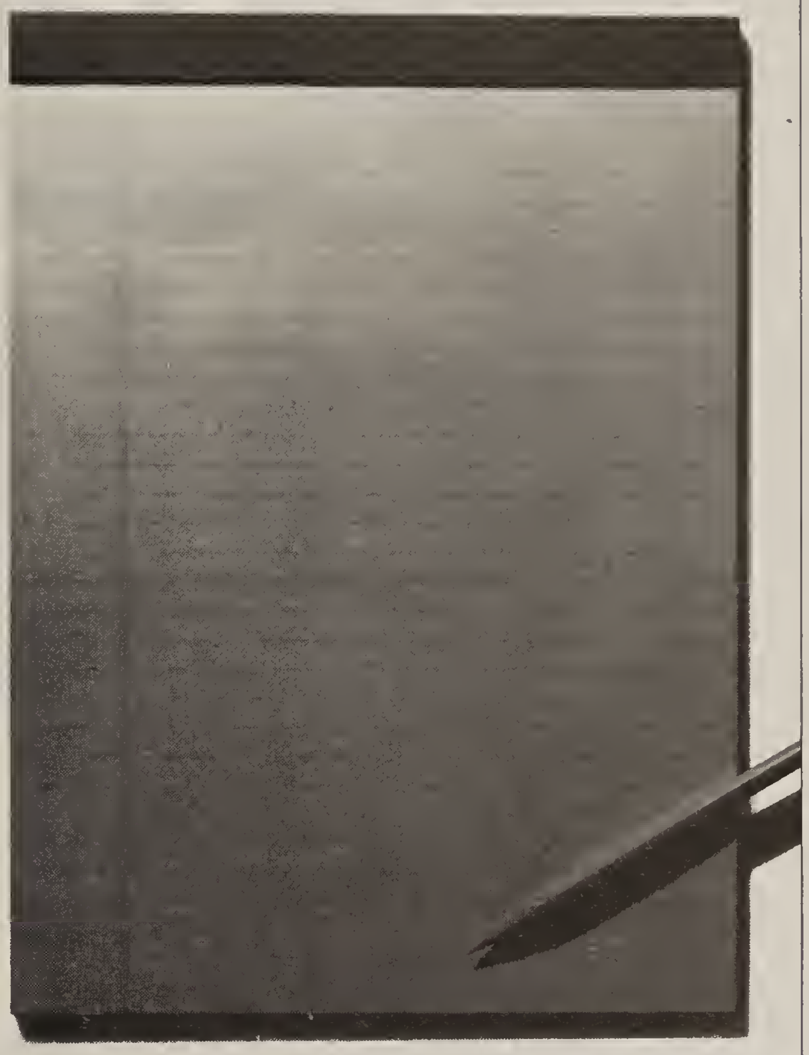

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The Newsweekly of Information Systems Management

No rushin' Soviets

So your boss is salivating over that great reservoir of untapped Soviet desktops, and you think you would like to bop over to Moscow and cut a little deal with those technology-hungry Russkies? Piece of *piroshki*, right? Wrong.

Grafting the capitalistic way of doing business onto a battered socialist society requires at least three things: patience, deep pockets and a high tolerance for vodka. While deals get done daily in the Soviet Union, nothing happens overnight.

"As much as there are special rules, unusual circumstances and exotic behavior, there is still overwhelming pressure [internally] toward making these deals happen," said Edward Lieberman, a tax attorney and Soviet specialist at the law firm of Cole Corette & Abrutyn.

Lieberman *counsels patience*

Most vendors start off thinking they'll ship products to the USSR for hard currency. However, the Soviets prefer joint ventures, which cost less to implement, he said. In return for technology contributions, Western partners get an interest in the venture, which is usually backed by some ministry or offshoot of the Academy of Sciences. These ventures can target internal or external markets and often involve coupling Western hardware with Soviet software.

Lieberman estimates that out of about 1,500 registered joint ventures, 150 are operating. In a recent interview, he outlined some of the negotiating steps involved. First, make sure that the people you are dealing with are authorized to enter into a contract.

All business deals require at least one nonbinding letter of intent called a "protocol." Soviet negotiators usually have a set goal of signing off on a particular protocol at each meeting. "You'll endure heavy negotiating, and they won't give until the last possible minute. Then they'll agree to whatever is necessary," Lieberman said.

At least two signatures are needed for a binding document. Any deal will need higher approval. Due diligence requires a feasibility study, which needs Ministry of Finance approval. Next, the parties draw up a contract and a charter, spelling out the venture's structure and operation. "There is no corporate law in the Soviet Union. If you don't spell it out, it doesn't happen," Lieberman warned. Finally, the Ministry of Finance stamps its approval via a registration number.

In lieu of hard cash, Western shareholders can collect either rubles, which typically are invested back into the venture, or another product, which often is sold externally for hard currency. Important projects may require all kinds of local permissions. "Some people make voluntary contributions of profits to the local republic. You can call it a tax or call it extortion. They figure you can afford it," Lieberman said.

PATRICIA KEEFE

INTERNATIONAL

BRIEFS

Giant (the remake)

Matsushita Electric Industrial Co.'s $37.75 billion in sales for its fiscal 1989, ended March 31, took the Japanese electronics mammoth beyond the six trillion yen mark for the first time late last month. That gives the company the necessary financial clout to embark on what will reportedly be the largest direct investment in overseas manufacturing by a Japanese concern yet — an information and communications equipment plant located in Fort Worth, Texas. According to the UK-based *Financial Times*, Matsushita said that its 1989 figures "reflected its ability to develop successful new products even in difficult business conditions."

....

Don't worry — we're happy

Japan's largest computer maker, **Fujitsu Ltd.**, weighed in late last month with its net profit up 24% to $549 million for its fiscal year ended March 31. Fujitsu sales for the year rose 6.8% to $16.14 billion, fueled by computers and data processing systems, as well as semiconductors and communications products, according to the company. Fiscal year 1989 was also very good to **Hitachi Ltd.**, which reported net income up 14% to $1.4 billion, and **Sony Corp.**, whose net income was up 49% to $676 million.

....

New horizon

Accustomed to the grueling attempt to survive in the ultra-competitive U.S.-based supercomputer market, Beaverton, Ore.-based **FPS Computing** (formerly known as Floating Point Systems, Inc.) may get a chance to boom in Japan, thanks to a recently announced distribution agreement with **Canon Sales Company, Inc.** Under an agreement arranged by Tokyo-based **Fuji Bank Ltd.**, Canon will acquire some of FPS' assets, as well as the right to use FPS' name, as it uses the company's computers to further expand into the growing Japanese workstation market.

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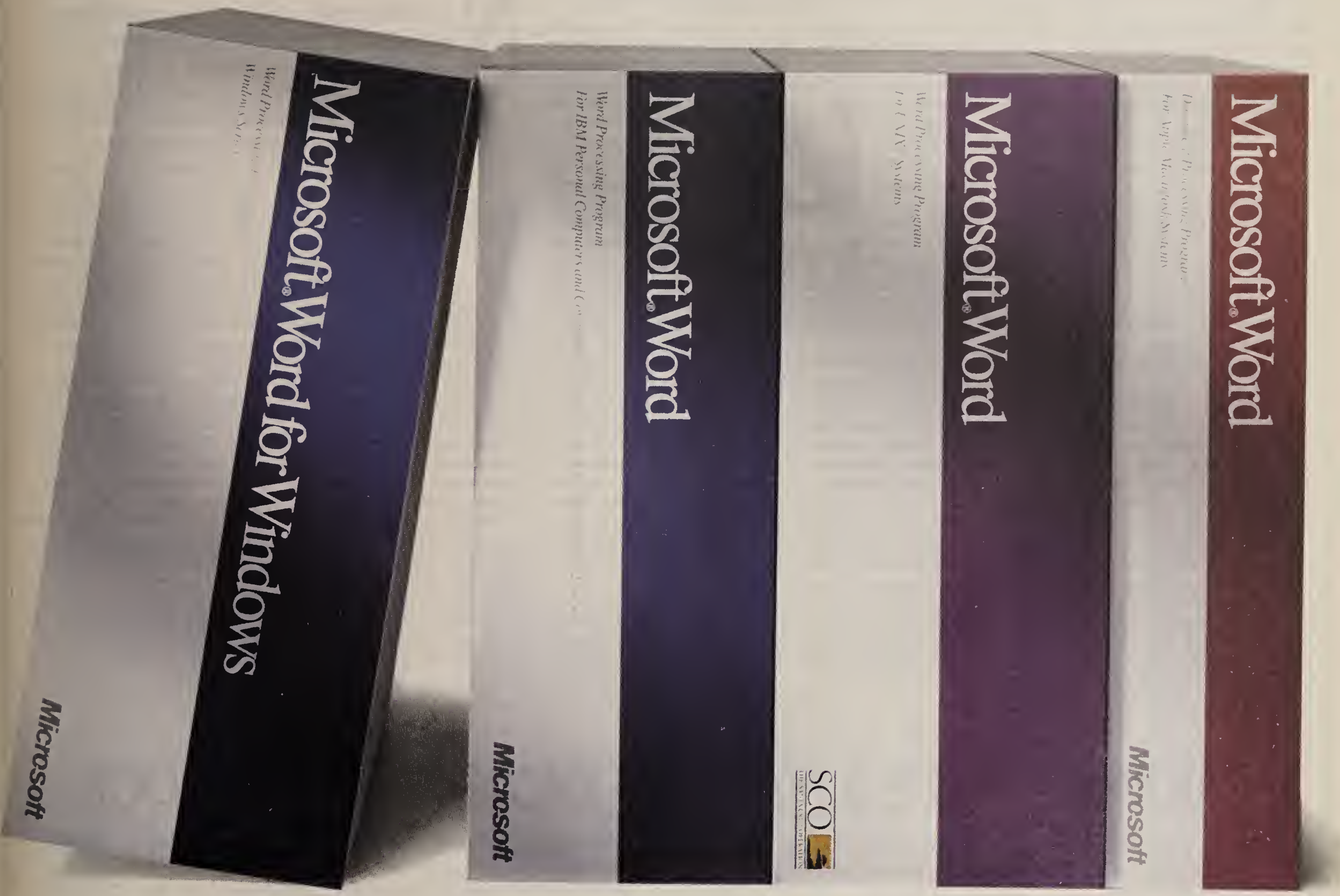

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COMPUTER CAREERS

Building your own network

Cultivating contacts can expand the sweep of your job search

BY JAMES H. LANE
SPECIAL TO CW

Networking — the language of computer systems and yuppies — can be a powerful tool for professional growth. Studies suggest that as many as 80% of new jobs are found through personal contacts. The technique can also be vital in promoting oneself in one's current position or learning about different disciplines and industries.

Unfortunately, many people have misconceptions about networking, which can lead them to dead ends and disillusionment. Networking should not, for example, be limited to contacts with people one already knows, as a star computer network sends data only between nodes and the host.

Networking calls for expanding an initial list of contacts by continually securing additional names, so the database actually regenerates itself. As a form of career insurance, we should be continuously using it to expand our base of contacts.

Successful networking calls for a combination of strategy and energetic implementation. However, it's important to take a judicious approach, applying sensitivity and courtesy when it comes to requesting meetings.

The following 10 do's and don'ts, when tailored to individual career plans, can help ensure networking success:

The do's

- Develop a plan. You wouldn't approach an important project at work without planning a strategy. Likewise, networking is a project — a marketing project — with you as the product.

Your self-marketing strategy should include defining an objective in terms of industries, companies and positions and targeting individual prospects. It would help to maintain a log and a tickler file to remind you of calls to make or appointments to keep.

- Be patient, yet persistent. Tenacity is the name of the game. Tactical steps to overcoming obstacles include befriending secretaries and other gatekeepers and telephoning busy executives directly in the early morning or after 5 p.m.

When making these contacts, always introduce yourself by mentioning the name of the mutual friend or acquaintance providing your entree.

If you encounter resistance from your target, ask for a critique of your approach. The feedback will probably be helpful, and a little flattery never hurts.

- Hang on to the reins. You can't always count on others to follow through, so stay in control of your job search.

If someone offers to pass along your resume, ask whether you might take the initiative and make the contact yourself, using the name of the mutual acquaintance. You should always be striving for face-to-face meetings.

- Be open-minded. Do not assume you should only network with decision-makers at targeted companies. Salespeople can use their extensive contacts to assist in job hunts. So can mail carriers, gas station attendants and school coaches. Don't overlook any source: Members of the clergy have been known to network on behalf of parishioners.
- Be appreciative. Good manners are a must. A gracious follow-up letter after a meeting sets you apart from other candidates, reminds the contact about the meeting and may help open the door for another one.

The don'ts

- Don't ask for a job! Regardless of your hidden agenda, the proper positioning for a networking meeting is a request for contacts, leads or professional advice — not a job. The rationale: Most people will not have an immediate opening and will probably decline if they get the impression you're only interested in a specific position.

On the other hand, always approach a networking meeting as if it were a job interview. This means researching the company, discreetly bringing a resume and never responding "I don't know" when asked about goals and objectives.

> NETWORKING CALLS for expanding an initial list of contacts by continually securing additional names, so the database actually regenerates itself. As a form of career insurance, we should be continuously using it to expand our base of contacts.

- Be careful about referring to competitors. After squeezing time from a busy day to meet with you, a contact may not want to hear about how you met yesterday with a business rival.
- Don't surprise anyone. No one appreciates "guess who?" calls from distant relatives, acquaintances or, worse yet, strangers.

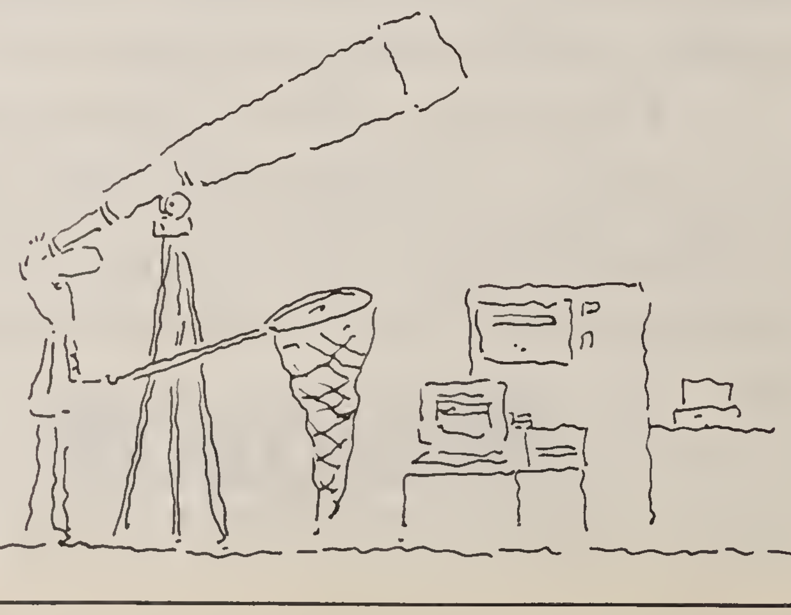
Position yourself with a write-call-write approach: a brief introductory letter mentioning the name of a contact or referral, a follow-up phone call (don't be discouraged if it takes several) and, eventually, a thank-you note if you're successful in scheduling a meeting.

- Don't turn down invitations. Even if you're not a social butterfly, take advantage of any opportunity when you're searching for a job. You can make valuable contacts at such functions as a cocktail party, a political fundraiser, a parent/teacher function or an alumni gathering. Don't underestimate such opportunities.
- Don't forget to reciprocate. The most offensive networking abuse is an unwillingness to network from the other side of the desk after you've been using the process to advance your own career.

Once you're comfortably ensconced in a new position, be generous with your time and counsel when a networker comes to call on you.

Following these guidelines — and using common sense — can produce results for people who practice the art of networking patiently and persistently.

Lane is president of the outplacement division at Costello & Co., a human resources consulting firm in Westwood, Mass.



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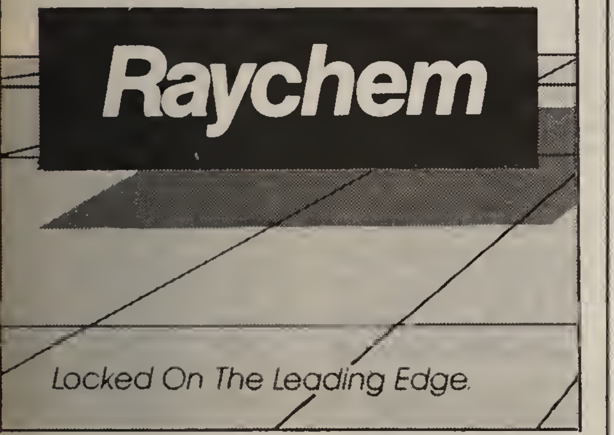

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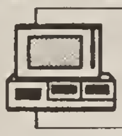

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60. Sys. Integrators/VARs/Consulting Mgt.
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11. President, Owner/Partner, General Mgr.
12. Vice President, Asst. VP
13. Treasurer, Controller, Financial Officer
41. Engineering, Scientific, R&D, Tech. Mgt.
51. Sales & Mktg. Management
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70. Medical, Legal, Accounting Mgt.
80. Educator, Journalists, Librarians, Students
90. Others ________
(Please specify)

3 **COMPUTER INVOLVEMENT** (Circle all that apply)
Types of equipment with which you are personally involved either as a user, vendor, or consultant.

A. Mainframes/Superminis
B. Minicomputers/Small Business Computers
C. Microcomputers/Desktops
D. Communications Systems
E. Local Area Networks
F. No Computer Involvement

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MARKETPLACE

Easing the way to integration

There is a way for PC users to tap mainframes without having IS on call

BY JESSICA KEYES
SPECIAL TO CW

Personal computer users have a problem: They are tired of routinely spending hours downloading data from the payroll program or a similar mainframe application. To do so, they must log on to the mainframe, bring up IBM's CICS and set up a file, then log out of CICS and onto IBM's TSO to download. Once the transfer is complete, they must reformat data to get it into their spreadsheets and into the right cells.

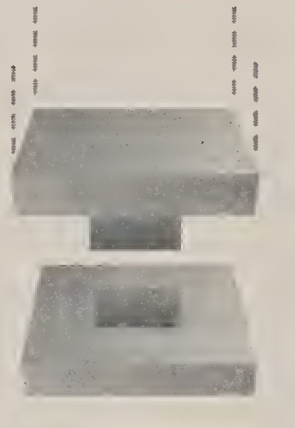
Other people encounter the problem in reverse. They spend hours re-keying data from a PC spreadsheet or database into a host system. They find no programmers available to help automate the task and none available anytime soon.

Most organizations use a variety of computer systems. Increasingly, these systems are spread among diverse platforms: PCs, minicomputers and mainframes. Information within one system is often required by another. What's a user to do?

During the 1980s, a new buzzword entered the information systems lexicon: Integration. However, integration means different things to different people. Let's run through the gamut of alternatives that software vendors are offering to address the problems.

The fully integrated software package. In this scenario, the information systems staff develops or purchases a system that takes into account the varied requirements of end users.

The problem is that this system is only as integrated as the current specifications demand. A year later, end users may find they face new requirements for entering information into the host computer that the specifications do not address. At that point, we are back to square one.



File transfer. This area is one in which the marketplace has provided some relief; it's the response with which most of us are familiar. There is hardly a corporate PC out there that is not equipped with a file transfer program.

While the programs most certainly do the job, they are also the cause of our laments: File transfer requires the IS staff to get involved, too. Staff members must write programs and build utilities to move the data.

The network as the answer. Vendors run full-page advertisements touting one communications standard or another as the leader in solving the integration problem. The major hardware vendors promote program-to-program standards and protocols to overcome some of the problems with simple file transfers.

The theory is that programs supporting a common standard can communicate with each other. However, while networks set up a standard for integrating data across diverse platforms, it's still necessary to do some sophisticated programming to collect, reformat, transfer and insert data between the source and target programs.

Query programs. Several vendors have developed software that lets users make inquiries of a mainframe database, extract information and place it in a file format compatible with popular PC software.

While this approach represents a step in the right direction, the problem is that the IS staff must support software components on both the mainframe and the PC to effect the file transfers.

Screen capture/keyboard stuffing. This type of PC package, which vendors tout as integration software but some users regard as a type of file transfer program, may present the most effective answer. There are currently half a dozen popular programs, their prices varying greatly according to functions performed and equipment supported.

In a nutshell, when data is displayed on the screen or entered at the keyboard, the software stores, reformats and forwards it to an application on the target system. Scripting languages used to write the translation table are not that different from Lotus Development Corp. 1-2-3 macros. End users can either learn them or hire a consultant to write the tables.

This approach is simple and clean. It avoids rekeying and eliminates the need to run a specialized package on the mainframe or have the IS staff create extract files for downloading or uploading.

These screen/keyboard products come in four flavors. Less sophisticated ones employ a cut-and-paste facility that requires little or no reformatting. Other packages work with specific hardware, such as IBM mainframes and IBM PCs. Hard-coded products are customized for a specific mainframe application or transfer problem; other tasks call for additional programming.

The newest entries, which have been available for the past two years, sport high-level programming languages. End users can install these products rapidly and customize them easily. The programs can work unattended and perform complex reformatting.

The PC-to-mainframe integration market pits a diversity of products against one another. IS managers will find that the optimal product requires the least involvement by their staff, automatically reformats data, moves it in both directions and communicates across several hardware platforms.

Keyes is president of New Art, Inc., a management and computer consulting firm in New York.

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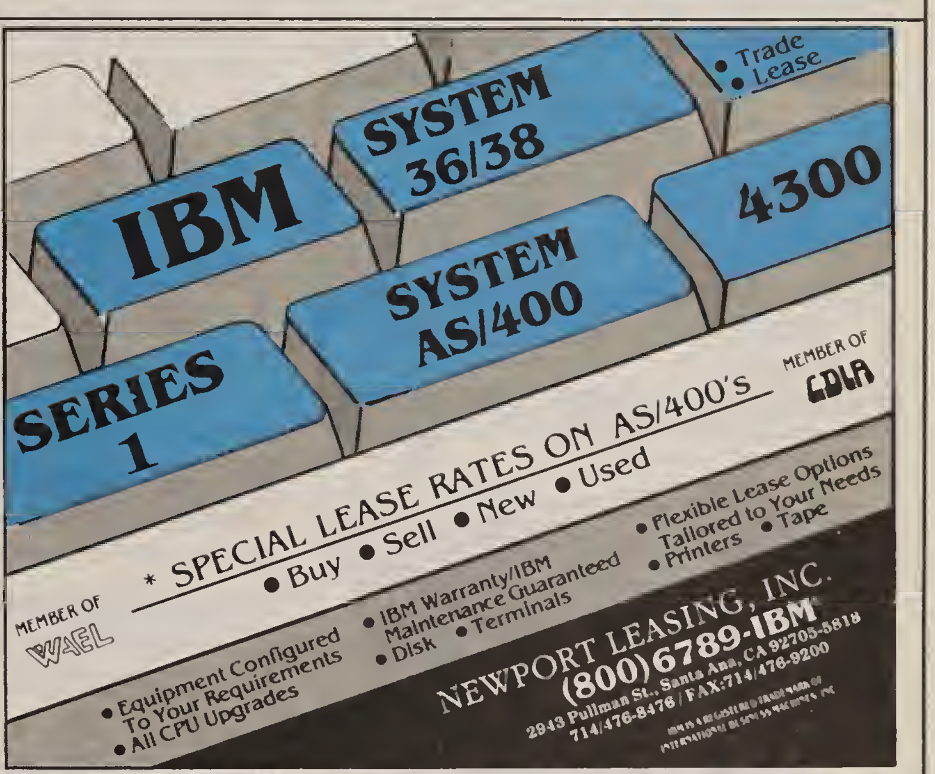

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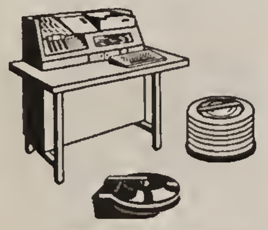

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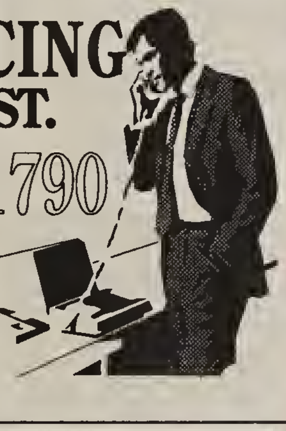

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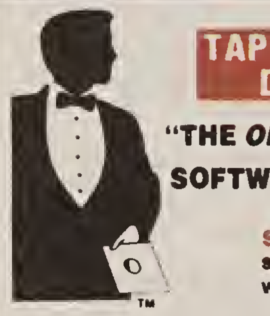

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Is your strategy penny-wise?

In-house training or outside firm? There's more to the answer than fees

BY NAOMI KARTEN
SPECIAL TO CW

A training manager I know claimed she had saved her organization thousands of dollars. The method: setting up an in-house program for personal computer training and charging less than an outside vendor would. Maybe the organization did save money, but it is instructive to look at how this individual reached her conclusion, because some executives would poke holes in her logic.

The local vendor offered courses for $300 each. To be competitive, the training manager charged $200. Her department averaged 50 enrollments per month, or 600 for the year, so the annual savings were $100 times 600 enrollments, or an impressive $60,000 — right? Well, not necessarily, and not just because we haven't taken into account the costs of running the training department.

Several more subtle issues arise. First, the calculation assumes that the same number of students who took the training in-house would have been sent to outside classes. But would they? Not necessarily; the number going outside might have been smaller.

Some managers think twice before sending staff members off-site, even when the price is right. They find it easier to justify training when they send someone down the hall rather than across town. Some managers view outside training as imparting greater status on the people who attend, so they're more selective in choosing them.

The second issue is calculating savings on the basis of enrollments rather than departmental training budgets. The manager claimed that if a department sends five employees to three in-house classes, it saves $1,500 — $100 for each enrollment. But she would be wrong if the department's training budget was only $3,000. In that case, the department could afford 15 in-house classes but only 10 outside enrollments; the savings should be based on 10 classes, not 15, so savings would come to $1,000 (10 times $100).

These calculations show how easy it is to mislead with statistics, even inadvertently. However, there is a more serious flaw in them that managers should guard against: assuming that everyone who attended training should have done so.

Most trainers know from experience that this assumption is false. They regularly cope with students who shouldn't have been in their classes because the students either didn't need to know the material or would not need it until far in the future.

How many employees do organizations send to training inappropriately? Some trainers estimate that the portion is as high as 30%. Unfortunately, many training departments lack the clout to screen out people who can't use the training or won't benefit from it. Yet the cost to the organization of training them — and of providing follow-up support — is substantial.

Organizations don't save money by holding in-house classes for these employees. Their presence represents an unnecessary cost, not a savings. Every time one of them attends a class, the organization loses money.

The point is that the low cost and accessibility of in-house classes can encourage managers to train employees who don't really need the instruction. On the other hand, the greater expense of outside courses provides a deterrent.

What price free training?

The extreme case is the organization that offers in-house training for free. Extending our example, would it be saving $300 for every employee trained or, in the case of some employees who may not need the training, throwing money down the drain?

Another question is what the organization could accomplish if it used more outside training vendors rather than fewer of them. Could it direct its limited in-house resources to more important subjects?

It may make sense for some training departments to offload some work, such as introductory courses, and assign instructors to classes that support critical business activities.

I don't mean to say that organizations shouldn't do their own training — turning to vendors isn't always a better alternative. The thing to remember is that it is easy to juggle a few numbers and "prove" savings without realizing the implications of an approach.

Key questions

The ease of demonstrating these savings can divert attention from more critical issues, such as the following:

- Is training making a difference on the job? Are the precise benefits clear?
- Are the right people being trained at the right time and in the right way?
- Is the training department making the best use of its limited resources?
- Is training cost-effective, no matter how it is delivered?

These questions don't yield to quick calculations. However, management is asking them more and more often, and training managers who want to survive had better know the answers.

Karten is president of Karten Associates in Randolph, Mass., and editor of the monthly newsletter "Managing End-User Computing."

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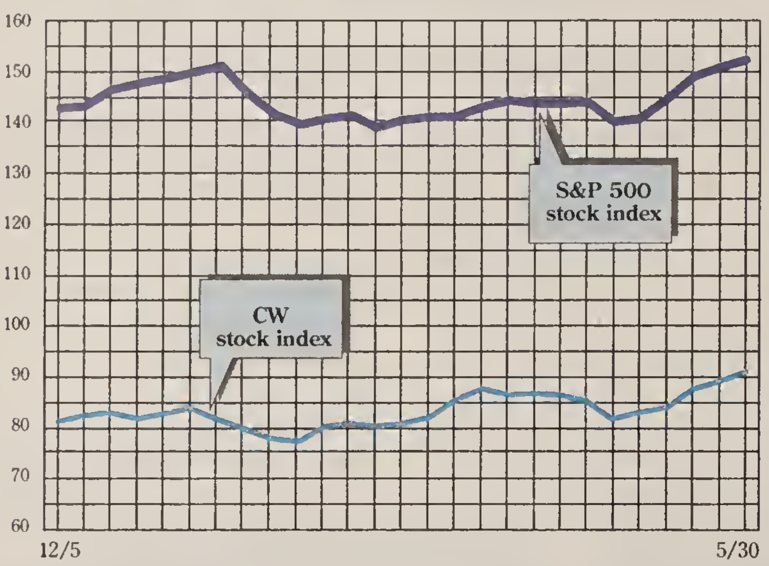

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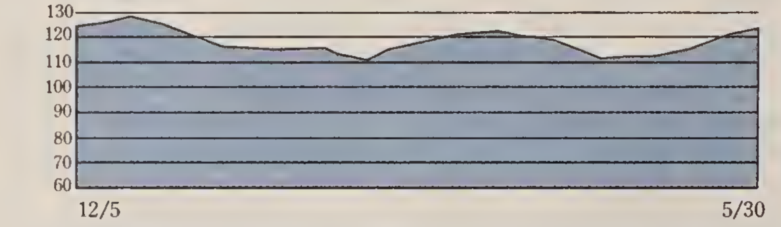

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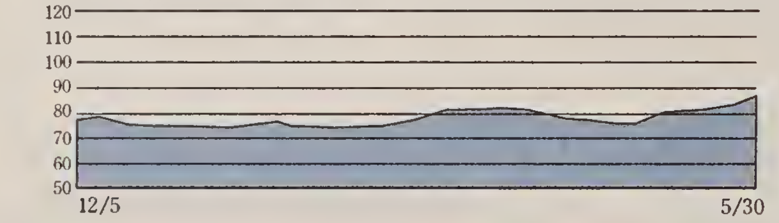

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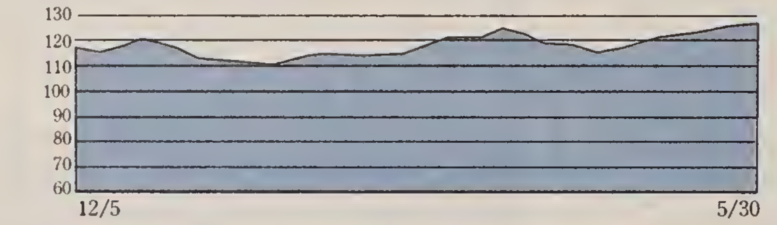

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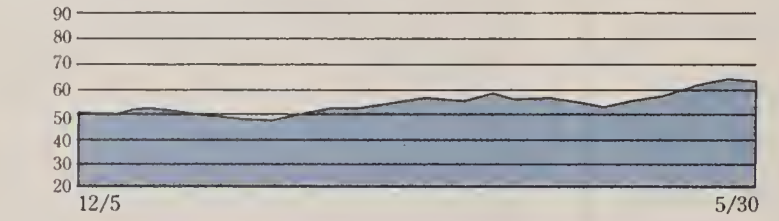

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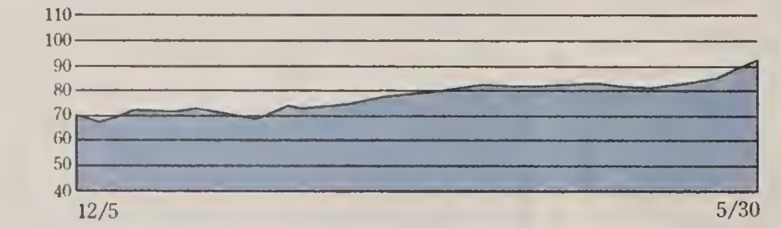

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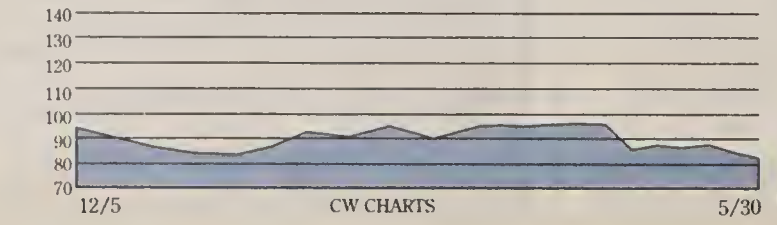

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N	AMERICAN INFO TECHS CORP	68	55	64.5	0.6	1.0
Q	ANDREW CORP	26	20	22.5	-0.5	-2.2
Q	ARTEL COMM CORP	10	5	6.375	0.0	0.0
N	AT&T	47	35	42.75	-0.4	-0.9
Q	AVANTEK INC	7	2	3.25	0.2	6.1
N	AYDIN CORP	21	14	14.125	-0.4	-2.6
N	BELL ATLANTIC CORP	57	43	52	-0.9	-1.7
N	BELLSOUTH CORP	59	46	56.25	-0.4	-0.7
Q	COMPRESSION LABS INC	15	7	13	0.3	2.0
Q	CONTEL CORP	37	23	28.375	0.6	2.3
Q	DATA SWITCH CORP	5	2	3.25	0.0	0.0
Q	DIGITAL COMM ASSOC	27	17	25.25	0.0	0.0
Q	DYNATECH CORP	21	15	15.5	-0.1	-0.8
Q	FIBRONICS INTNL INC	9	5	8.75	0.0	0.0
Q	GANDALF TECHNOLOGIES	7	2	2.938	0.0	0.0
N	GENERAL DATACOMM INDS	7	3	3.875	0.4	10.7
N	GTE CORP	72	52	65.125	-0.9	-1.3
Q	INFOTRON SYS CORP	13	4	4.125	0.0	0.0
N	ITT CORP	65	51	56.75	0.4	0.7
N	M A COM INC	9	3	4.75	1.0	26.7
Q	MCI COMMUNICATIONS CORP	49	31	43.25	0.3	0.6
N	NETWORK EQUIP TECH INC	34	9	10.625	0.0	0.0
Q	NETWORK SYS CORP	15	7	13.5	-1.1	-7.7
N	NORTHERN TELECOM LTD	27	17	27	1.0	3.8
Q	NOVELL INC	51	24	51.25	7.0	15.8
N	NYNEX CORP	92	75	87.5	1.4	1.6
N	PACIFIC TELESIS GROUP	52	39	46.25	-0.5	-1.1
A	PENRIL CORP	7	4	7	-0.1	-1.8
N	SCIENTIFIC ATLANTA INC	28	17	27.75	1.0	3.7
N	SOUTHWESTERN BELL CORP	65	50	58.125	1.0	1.8
Q	3 COM CORP	28	10	14.25	0.5	3.6
N	U S WEST INC	41	33	37	0.3	0.7

Computer Systems

Q	ALLIANT COMPUTER SYS	8	4	7.875	0.8	10.5
Q	ALPHA MICROSYSTEMS	8	3	3.625	0.0	0.0
Q	ALTOS COMPUTER SYS	8	5	5.375	-0.1	-2.3
A	AMDAHL CORP	23	11	16.125	0.4	2.4
Q	APPLE COMPUTER INC	50	32	41.375	-0.6	-1.5
Q	AST RESH INC	25	7	25.125	0.5	2.0
N	BOLT BERANEK & NEWMAN	9	4	5	-0.1	-2.4
N	COMPAQ COMPUTER CORP	124	73	119.5	-3.4	-2.7
N	COMMODORE INTNL	18	6	7.5	0.0	0.0
N	CONTROL DATA CORP	23	16	21	0.8	3.7
N	CRAY RESH INC	54	31	47.25	-0.8	-1.6
Q	DAISY SYS CORP	5	0	0.531	0.1	13.2
N	DATA GEN CORP	19	8	10.875	1.0	10.1
N	DATAPOINT CORP	6	2	2.875	0.3	9.5
Q	DELL COMPUTER CORP	13	5	11.375	1.3	12.3
N	DIGITAL EQUIP CORP	103	70	93	-0.3	-0.3
N	FLOATING POINT SYS INC	4	0	1.875	1.1	130.6
N	HARRIS CORP	40	28	35	0.4	1.1
N	HEWLETT PACKARD CO	58	40	48	0.6	1.3
N	HONEYWELL INC	103	73	100.25	0.4	0.4
N	IBM	122	93	120.875	2.1	1.8
Q	INFORMATION INTL INC	16	12	13	1.5	13.0
Q	IPL SYS INC	14	5	10.25	-0.5	-4.7
N	MAI BASIC FOUR INC	7	2	2.75	0.0	0.0
N	MATSUSHITA ELEC INDL LTD	180	123	146	-1.3	-0.8
Q	MENTOR GRAPHICS CORP	25	14	24.125	0.1	0.5
N	NBI INC	3	0	0.25	-0.1	-20.1
N	NCR CORP	72	53	69.125	-0.5	-0.7
Q	PYRAMID TECHNOLOGY	36	9	35	0.3	0.7
Q	SEQUENT COMP SYS INC	31	11	30.5	1.3	4.3
Q	SHAREBASE CORP	3	0	0.531	0.0	-5.7
Q	SUN MICROSYSTEM INC	33	13	30.5	-1.8	-5.4
Q	SYMBOLICS INC	2	0	0.563	0.1	12.6
N	TANDEM COMPUTERS INC	30	17	28.375	-0.3	-0.9
N	TANDY CORP	49	30	37.125	3.5	10.4
N	ULTIMATE CORP	12	5	6.875	0.0	0.0
N	UNISYS CORP	28	12	14.375	0.3	1.8
A	WANG LABS INC	9	4	4	-0.1	-3.0

Software & DP Services

Q	AMERICAN MGMT SYS INC	16	11	15.375	0.6	4.2
Q	AMERICAN SOFTWARE INC	26	14	24.375	-0.1	-0.5
N	ANACOMP INC	8	3	2.75	0.0	0.0
Q	ANALYSTS INTL CORP	20	14	18.75	0.3	1.4
Q	ASHTON TATE	24	9	12.125	0.0	0.0
Q	ASK COMPUTER SYS INC	16	7	9.625	0.0	0.0
N	AUTO DATA PROCESSING	59	38	57.25	-0.1	-0.2
Q	AUTODESK INC	53	33	51	-0.8	-1.4
Q	BMC SOFTWARE INC	26	12	24.75	-0.3	-1.0
N	BUSINESSLAND INC	14	7	9	0.4	4.3
Q	COGNOS INC	9	4	8.5	1.4	19.3
N	COMPUTER ASSOC INTL INC	22	11	15.125	-0.1	-0.8
Q	COMPUTER HORIZONS CORP	15	7	14.25	0.0	0.0
N	COMPUTER SCIENCES CORP	59	40	49.25	3.5	7.7
N	COMPUTER TASK GROUP INC	15	9	11.375	-0.1	-1.1
Q	COMSHARE INC	44	31	43	1.5	3.6
Q	CORPORATE SOFTWARE	16	8	13.5	0.0	0.0
N	GENERAL MTRS (CLS E)	37	24	35.625	-1.1	-3.1
Q	HOGAN SYS INC	7	4	4.25	0.5	13.3
Q	INFORMIX CORP	17	8	15.25	0.3	1.7
Q	INTELLICORP INC	7	3	6.875	0.6	10.0
Q	LEGENT CORP	32	19	26.5	0.3	1.0
Q	LOTUS DEV CORP	38	21	37.75	3.8	11.0
Q	MICROSOFT CORP	79	26	75.5	-0.4	-0.5
Q	NATIONAL DATA CORP	35	13	15.25	0.4	2.5
N	ON LINE SOFTWARE INTL INC	11	6	7.75	-0.8	-8.8
Q	ORACLE SYS CORP	28	15	19.625	-0.1	-0.6
N	PANSOPHIC SYS INC	19	10	13.75	0.0	0.0
Q	PHOENIX TECHNOLOGIES INC	15	2	2.75	0.0	0.0
Q	POLICY MGMT SYS CORP	39	28	39	2.5	6.8
Q	PROGRAMMING & SYS INC	23	16	22.25	-0.1	-0.6
Q	RELATIONAL TECH INC	11	5	7.375	-0.3	-3.3
N	REYNOLDS & REYNOLDS CO	34	19	22.625	0.0	0.0
Q	SAGE SOFTWARE INC	16	7	14.375	-1.0	-6.5
Q	SEI CORP	21	15	20.125	0.9	4.5
Q	SHARED MED SYS CORP	18	12	12.875	-0.3	-1.9
Q	SOFTWARE PUBG CORP	28	13	26.75	-0.3	-0.9
N	STERLING SOFTWARE INC	11	6	11	0.6	6.0
Q	SUNGARD DATA SYS INC	26	15	21.375	-0.6	-2.8
Q	SYSTEMATICS INC	46	30	43.625	-1.4	-3.1
N	SYSTEM CENTER INC	26	17	20.75	-0.3	-1.2
N	SYS. SOFT INC	29	14	26	-0.5	-1.9
Q	WORDSTAR	3	1	1.063	-0.1	-5.5

Semiconductors

N	ADV MICRO DEVICES INC	11	7	10.75	-0.4	-3.4
N	ANALOG DEVICES INC	12	7	7.875	-0.1	-1.6
Q	ANALOGIC CORP	11	9	9	-0.5	-5.3
Q	CHIPS & TECHNOLOGIES INC	26	15	20.25	-1.0	-4.7
Q	INTEL CORP	49	28	47.875	-0.1	-0.3
Q	MICRON TECHNOLOGY INC	26	7	14	-0.6	-4.3
N	MOTOROLA INC	84	51	82	2.0	2.5
N	NATL SEMICONDUCTOR	9	5	8.375	-0.3	-2.9
N	TEXAS INSTRS INC	47	28	42.375	-1.0	-2.3
A	WESTERN DIGITAL CORP	13	6	13	0.0	0.0

Peripherals

Q	ALLOY COMP	3	0	0.938	0.2	25.1
N	AM INTL INC	6	2	2.25	0.0	0.0
Q	AUTO TROL TECH CORP	6	2	3	0.4	14.3
Q	BANCTEC INC	23	13	22.375	1.3	5.9
A	COGNITRONICS CORP	8	3	5.125	0.4	7.9
Q	CONNER PERIPHERALS	26	10	24.75	-0.5	-2.0
A	DATARAM CORP	17	8	16.5	0.6	3.9
N	EASTMAN KODAK CO	52	36	41.125	0.5	1.2
N	E M C CORP MASS	7	3	6.125	0.1	2.1
Q	EMULEX CORP	11	4	5.75	0.6	12.2
Q	EVANS & SUTHERLAND	35	17	32.25	-0.1	-0.4
Q	ICOT CORP	3	1	1.375	0.0	0.0
Q	INTERLEAF INC	9	5	6.375	0.0	0.0
Q	IOMEGA CORP	6	3	4.5	0.4	10.8
Q	LEE DATA CORP	4	1	1.5	0.2	14.2
Q	MASSTOR SYS CORP	4	1	1.313	-0.1	-4.5
Q	MAXTOR CORP	16	7	16	0.3	1.6
Q	MICROPOLIS CORP	9	3	8	-0.3	-3.8
N	MINNESOTA MNG & MFG CO	85	68	82.625	-0.1	-0.2
Q	PERSONAL COMP PRODUCTS INC	5	4	4	-0.3	-5.9
Q	PRINTRONIX INC	14	7	13.25	0.1	1.0
N	QMS INC	19	8	18	0.3	1.4
Q	QUANTUM CORP	23	7	21.25	0.4	1.8
N	RECOGNITION EQUIP INC	13	5	4.875	-0.3	-4.9
Q	REXON INC	10	6	9.5	0.1	1.3
Q	SEAGATE TECHNOLOGY	20	10	14.875	1.0	7.2
N	STORAGE TECH CORP	31	9	30.375	1.8	6.1
Q	TANDON CORP	3	0	2.813	0.8	40.7
N	TEKTRONIX INC	24	12	14.875	1.1	8.2
Q	TELEVIDEO SYS INC	1	0	0.219	0.0	-12.4
N	XEROX CORP	69	46	46.5	-2.5	-5.1

Leasing Companies

Q	AMPLICON INC	17	7	7.25	0.3	3.6
N	CAPITAL ASSOC INTNL INC	8	3	2.875	-0.4	-11.5
N	COMDISCO INC	34	17	19.25	0.5	2.7
Q	CONTINENTAL INFO SYS	1	0	0.141	0.0	-9.6
Q	LDI CORPORATION	18	13	15	0.3	1.7
Q	PHOENIX AMERN INC	5	3	4.125	0.0	0.0

EXCH: N = NEW YORK; A = AMERICAN; Q = NATIONAL

Tortoise race

Slow week in high-tech sector as few firms inch way to profit

Consistent. Now that's something technology stocks are not. Last week's movement was scant compared with the bang-up action of the week before.

A gain of 3¾ points made IBM one of the bigger performers during the short holiday week. IBM closed Thursday at 120, while Apple Computer, Inc. added 1¼ points to end at 41¼. Data General Corp. strode forward 1⅞ points to 12⅛. Digital Equipment Corp. inched up just ¼ of a point to 92¾.

Telecommunications issues appeared to be the talk of the town. United Telecom, parent company of U.S. Sprint Communications Co., rang up 2¾ points to close at 46 on Thursday, while MCI Communications Corp. added 1¼ to 42⅝. AT&T was on the receiving end of a 1½-point gift from investors, which pushed its stock price to 43⅛.

Microsoft Corp. flip-flopped last week — first losing, then gaining, then losing again. Thursday's close left Microsoft at 73, down 1¼ points for the week. Among others in the software sector, Lotus Development Corp. climbed to 37¾, up 1½ points, while Novell, Inc. edged up ⅞ of a point to 49¼. Adobe Systems, Inc. picked up ⅜ of a point to close at 35⅝ — small consolation after its recent one-day 15¼-point swan dive.

KIM S. NASH

NEWS SHORTS

IBM ships interim Officevision

Last week, IBM shipped Officevision Release 1.1, an interim product that runs on OS/2 Extended Edition 1.2 and IBM's LAN Server program Version 1.2. It serves as a stopgap until the delayed Officevision Release 2.0 ships in volume in the first quarter of 1991. Release 2.0 was supposed to have shipped in March [CW, March 5]. Release 1.1 provides additional functionality over its predecessor, Release 1.0, but lacks the full power promised under 2.0. Release 1.1 users reportedly can add OS/2 application icons to the menu on their Officevision desktop.

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ALR readies multiprocessor

Advanced Logic Research, Inc. will join the small but growing multiprocessor microcomputer gang when it unveils its Multiaccess Series 3000 this week at Comdex/Spring '90 for fourth-quarter delivery. Unlike the two-processor Compaq Computer Corp. Systempro, the ALR machine can accommodate six Intel Corp. I486 processors, ALR said. With six processors, the $16,000 system can deliver the equivalent of 120 VAX MIPS, a spokesman claimed. Hard-disk options range up to 650M bytes.

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Oracle ships for mainframe AIX

Oracle Corp. said last week that it is shipping beta-test versions of its Oracle Version 6.0 relational database management system for IBM's RISC System/6000 and AIX/370 for the IBM mainframe to several user sites. The Oracle software, which should be generally available in production versions in July, was ported to the AIX systems at IBM's request, Oracle said.

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Nynex runs net manager trial

Large Nynex business customers will soon be able to blast off a message — on-line — to report troubles with their phone lines directly to the phone companies. That capability is part of Nynex's software-based Nynex Network Services Manager tool that will be available for New York Telephone and New England Telephone customers early next year. A trial of the system is being conducted now in Boston and New York. Other capabilities allow users to perform line testing of switched services, obtain traffic measurement reports and have log-on access to Nynex's Centrex Customer Rearrangement System.

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GTE wins frequent-buyer's contract

GTE Retail Information Services has been selected to run the information system for the Giftlink Shopper's Reward Program, a forthcoming frequent-buyer's program sponsored by several major consumer-goods companies, including Procter & Gamble Co. The GTE Corp. unit, based in Atlanta, will gather retail data on buyers' accumulated points in a database so consumers can redeem points for merchandise or vacations.

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Developer program boosts Unix V

Unix International — an AT&T-backed consortium of independent organizations driving Unix System V as an industry-standard version of the operating system — last week announced a program to help software vendors port application programs to Unix System V, Release 4 and market the products. The program includes more than 150 porting centers worldwide, a software support network of over 10,000 engineers and worldwide commercial and technical conferences.

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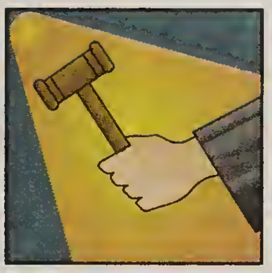
Tandem cuts Cyclone entry point

Aiming at users with pilot projects and those wishing to add on to its older high-end system, Tandem Computers, Inc. said it will sell its fault-tolerant, transaction-processing Cyclone computer in a two-processor configuration. Cyclone, introduced in October 1989, came in an earlier entry-level configuration of four processors for $2 million. The new two-CPU configuration costs $1.25 million. The company also lowered the entry point to the midrange CLX from $53,000 to $40,000, but the new configuration is not upgradeable.

Infringement claim dismissed

BY NELL MARGOLIS
CW STAFF

NEW YORK — Round 1 of Refac International Ltd.'s patent infringement lawsuit against Lotus Development Corp. and other major spreadsheet vendors went decisively to the defendants last week when a federal judge dusted off a seldom-used state law to dismiss the suit.



Refac is a 38-year-old licensing company that acquires broad technology patents and then goes after alleged infringers. It went to court last July armed with a 1983 patent that it claimed covers the process by which computers process spreadsheets.

The patent in question was originally issued to two Canadian inventors, who assigned it to a Canadian corporation, Forward Research Systems Ltd. (FRS). Last summer, FRS traded Refac a 5% interest in the patent in return for Refac's contractual promise to sue at least two of the firms allegedly using the patented technology — and to do it within one month of the agreement [CW, July 24, 1989].

Refac charged patent infringement and demanded up to 5% royalty payments from popular spreadsheet purveyors Lotus, Microsoft Corp., Ashton-Tate Corp., Borland International, Informix Software, Inc. and Computer Associates International, Inc.

A victory for the plaintiff, which seeks royalties extending from the patent's issue date to its expiration in the year 2000, could take a hefty bite out of the respective vendors' spreadsheet revenues. And that might not be all. Several legal commentators said it could conceivably reach into the pockets of spreadsheet users as well.

Last week, U.S. District Judge Michael Mukasey invoked the so-called New York Champerty statute — a law that renders illegal any transfer of a right specifically for the purpose of bringing a court action — and ruled the FRS/Refac agreement void in New York.

"Refac's agreement with FRS is nothing but a hunting license," Mukasey said.

Unless FRS joins or replaces Refac as plaintiff within 10 days, the ruling said, the case is over.

Refac founder and President Eugene Lang said that "of course, FRS will be joined [as a party plaintiff]." FRS could not be reached for comment.

Lang added that he was stunned by the setback. "The last thing in the world that we would have expected is this decision — it comes completely out of the blue," he told *Computerworld*. "Buying a lawsuit was the furthest thing from our minds."

Lang — a self-styled defender of the entrepreneur's rights — said he founded Refac to "create a level playing field for the little guy." However, the firm has racked up a resume that causes some to question its means, if not its ends.

To date, Refac has reportedly sued some 2,000 companies and threatened to sue half again that number. Furthermore, Mukasey's is only the most recent wrist-slapping it has received; at least two other federal judges have cited the firm for questionable — albeit, not illegal — practices.

"We're very pleased" with Mukasey's ruling, said Henry Gutman, an attorney representing Lotus. While not reaching the merits of the patent dispute, "this certainly tells us something about Refac's practices," he said.

"It's nice to have a judge see Refac for what they are," said Steven Kahn, an attorney representing CA.

Kapor

FROM PAGE 1

eral-state task force. "We're going after people who have used computers to perpetrate financial fraud," Thackeray added.

"It's plausible there's a witch-hunt going on," Kapor was quoted as saying in the article. "I'm concerned that hackers' civil liberties are being violated. I'm concerned these kids, which is mostly what hackers are, aren't getting a fair shake in the legal system. They don't have access to legal counsel that would let them adequately defend their rights."

Kapor told the paper he had been solicited by two law firms with a proposal for the defense fund.

Investigators served 28 search warrants on suspected hackers in New York, Chicago, Phoenix and Los Angeles. "We've arrested the evidence," Thackeray said. "The only legal argument these people have is whether they're entitled to the return of their property."

"There's a widespread perception in enforcement circles that the computer industry is not committed to fighting the hacking problem," said Ken Rosenblatt, deputy district attorney for Santa Clara County, Calif., who heads the high-technology unit at the district attorney's office. "Someone like Kapor is a very high-profile figure, so his statements really strike a blow to the enforcement effort," he said.

Spokesmen for software industry groups had a chilly reception to Kapor's plan.

Kapor offers *controversial defense fund for alleged hackers*

"Mitch is a wonderful guy, but on this issue, I think he's confused," said Ken Wasch, executive director of the Software Publishers Association in Washington, D.C., which represents 660 software firms and aggressively defends intellectual property rights.

"We've been fighting illegal electronic bulletin boards — not the ones that provide educational information for legitimate purposes," Wasch said. "We're talking about publishing MCI access codes and credit-card numbers and allowing people to download copyright-protected software."

"Mitch has got to realize that these people aren't necessarily all fresh-faced young kids who have lofty motives," said Doug Jerger, director of Adapso's Software Industry Division in Arlington, Va. "We think it's important to prosecute the sinister-minded hackers who are knowingly breaking the law."

Kapor was unavailable for comment last week, and his secretary said on Friday that Kapor "can't say when there will be an announcement" about the fund.

Kapor reportedly said he feels that bulletin boards promote technological innovation and that the prosecution will have a "chilling effect" on the free flow of information.

"As a civil libertarian myself, it troubles me to be characterized as being on the side of a witch-hunt," Wasch said. "But the federal government is after people who are engaged in unlawful practices."

Rosenblatt said authorities in his jurisdiction have been unable to prosecute many hacker cases because of lack of funds.

"I wish he'd put his money into law enforcement," Rosenblatt said. "We could use it."

The price of being Watson Jr.

Former IBM chief talks candidly of life with father and company

Thomas Watson Jr. says he had the best father in the world, despite the often tempestuous relationship he candidly describes in his new autobiography Father, Son & Co. *(Bantam, New York). Watson and his legendary father combined to head IBM for nearly 60 years and built the prototypical corporation of U.S. business. Now 76, Watson graphically describes the battles with his father that often left them both in tears, but he fears that his book might make readers focus too much on those conflicts. One friend told Watson, "You haven't written a book, you've written a love story." Says Watson, "That delights me, because that's what I wanted to do." Watson, who retired as IBM chairman in 1971, met last week with* Computerworld's *Glenn Rifkin and Joe Maglitta in his Greenwich, Conn., home to discuss the book, his life and the business world.*

You say in the book that your life at IBM came at some cost to yourself, to your family and to other IBM executives. Was it worth it?
Funny, I think that men are primarily ambitious. It's sort of the fundamental motivator of a man. We as a team at IBM all were very close family men. I hardly ever saw a divorce or anything of that sort.

However, the excitement of growing at 17% a year was like riding a runaway horse. We had reorganization on reorganization. We had a new top management committee every four or five months. We were bringing in more and brighter people, hiring engineers by the thousands, hiring Harvard Business School graduates by the dozens, trying to fill in underneath to make this enterprise strong and growing. It *was* hard on family. I'd pull in here at 10:06 at night, and you don't have much left then. You sleep seven hours and go out at 7:40 the next morning, and that's life.

Would you have done anything differently?
I think that any executive who gets to this point thinks that maybe he could have better balanced his time between his children and what was happening. But I did a lot of things to try to make up for that.

At IBM, were there people you lost who you wanted to keep?
I hated to lose anybody. I hated to lose Gene Amdahl. I admired Gene Amdahl, and I used to go out to California to see him every year. But he was a true genius, you can see that. I hated to lose the fellow who went to Xerox, David Kearns. He was a very promising young man at IBM. But during the time I worked for IBM, I lost very few people that we felt very badly about.

What is your connection to IBM today?
Not much. My wife tells me the stock went up a few points yesterday. I don't look at the stock market news about IBM. I chat with [IBM Chairman John] Akers once in a while at his invitation, occasionally at mine. I think he's doing a great job. He inherited some very difficult problems by chance, not by anybody's fault. He's got them all straightened out, and I'm proud of the way he's operated.

Photos by Joyce Ravid

Former IBM head *Thomas Watson Jr. says he's been brought up in a tradition of people first, not last*

Would your father be happy with IBM today?
Yes, I think he'd be very happy.

What did you do at IBM that you were most proud of?
After the war, taking that rack of tubes feeding into a keypunch machine and putting it in nicer form and saying, "Here's the world's first electronic computer." And then having the sudden realization that this was IBM's future.

Your father was more than hesitant about moving into computers.
A lot of people denigrated him on electronics. He didn't understand electronics; I didn't understand it very well. I knew it went fast; he knew it went fast. He sent me up to a lab one day and said, go and see Mr. So-and-so.

"What do you want me to see?" I said. He said, "I don't know what the fellow is doing, but he's doing it at 200,000 times a second."

In your book, you talk at length about the System 360. That seems to have been a massive accomplishment.
I can take some credit for that, but not a great deal. The 360, the need for it, was conceived by the pressures of the field. All of the customers had different kinds of programming, so we had to get the line standardized. I took more chances with this new line than I would have at any other time, because our lines had just run out.

The 360 seemed to be a real "bet the company" decision.
I never said that we bet the company; Bob Evans [an IBM engineering executive on the 360 project] said that. We could have survived a total failure with the 360 and come out again with enough money to finance and keep going. But it would have been a terrible disaster.

Why did you write *Father, Son & Co.*?
What I principally wanted to do in this book was show the greatness of my father. I chose to do it, after a lot of advice from people, through simply telling the story of my life and my association with him.

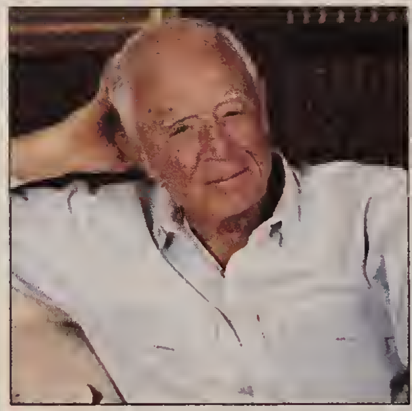
The book paints a picture of a difficult relationship for both of you.
From the time I was very small, I had the feeling from my father that I was not an outstanding youth, that I was so far down the line in ability and energy. Youth was a very painful time for me. So a second reason for writing the book was to say to people, "If you are a nonstarter, or if you have a child who is a nonstarter, don't give up, because the writer of this book didn't really get started until he was 27." That's why I let it all hang out, because it was a very uncomfortable time for me.

Taking over from a powerful father isn't easy. You saw the situation at Wang Labs?
Yes, I know young [Frederick] Wang. He went to Brown. My heart bled for both of them. I don't have any idea what happened inside the house of Wang. But when you are coming up in that kind of environment, if you don't fight for more authority, you will end up with your father dying and you won't have had any authority, and tomorrow you have it all. And that isn't the way to get authority.

What about your own children and IBM?
I only have one son. He did work for IBM for one year, not at my suggestion. He worked in London because he wanted to see whether he liked it. While in London, he decided he wanted to be a lawyer, so he came back, and he is now a lawyer. He's not associated with IBM. My youngest daughter worked for IBM for three years, made the Hundred Percent Club, but then she got married.

How would your father have felt to read this book?
He'd probably say, "Well, that's Tom's way, it's not my way, but it's a pretty darn good history of the IBM company. And I have no strong objections to anything that's in it." He wouldn't have written a book anywhere like that book. The reason why, in his day, we looked pretty monolithic is that as he got older he wanted more and more to present a very pleasant picture of himself and the business to the public.

Father believed in trying to live the most godly life he could, and more and more so as he got very old. He wanted to be more perfect than anybody could be. But that was, I thought, just an old man's foible. The real true Tom Watson was red-blooded and strong; give him a destination out there, and he'd get there somehow.



THE 360 . . . was conceived by the pressures of the field. I took more chances with this new line than I would have at any other time, because our lines had just run out.

THOMAS WATSON JR.

What's your take on how the U.S. is doing now?
It's a very mixed time in America, and it's a tragedy that we've gone through this Wall Street money scandal. We've set a bad example for our young people. I find out what they really want to do is go down there and make $10 million or $20 million, and that's it.

The idea to make things is not around much anymore. The way some of them have made their money, first by being dishonest, but second by a complete lack of any heart for people. The people kind of get lost in the deal. And the people are just like a commodity, like a pot of coal. I've been brought up in a tradition of people first, not last.

We have an opportunity, and we're at a crossroads. But entrepreneurs in the U.S. have to recognize that it isn't the buying and selling of companies that's important, it's getting new products and driving the country ahead with new products. There's no reason for the Japanese to have taken over our car market. It makes me sick to see that happen. It makes me sick to see people lose a lot of the market and get a bonus.

You have said that America needs more fear.
Yes. If I were the automobile companies, I'd be scared to death until I found the formula to beat the Japanese. The Japanese have to pay their people about the same amount as we pay our people, so they are simply better at managing automobile plants than we are.

Are CEOs today in America overpaid?
If you divide by the factor of inflation, most of them seem to be relatively in line. They are mixed in with an assortment of grasping people who are paid way out of line. The whole idea of golden parachutes is for the birds. I was paid about $500,000 a year at IBM. I was paid because I was at risk, and the stockholders could come in and fire me. Now if I get a golden parachute and I leave with $4 million, why do I get the high pay? I have no risk. We ought to pay for risk; we ought to pay for advancement.

Looking back, how satisfied are you with your life?
I had 15 great years to oversee IBM. Since then, I've mixed public service with adventure. I just think I'm the luckiest guy in the world. I've just had a terrific life. A terrific father, terrific mother, a wonderful relationship. The world doesn't owe me a single thing.

Repository

FROM PAGE 1

have not been told is how extensive the information model will be. Nobody knows. They've only spoken about it in very general terms."

For end users, the initial Repository Manager will bring benefits once software developers get to work with it, observers said. They must first tailor their tools to work with it, and end users will not start seeing those results until later this year. Once these tools become available, users can begin to work with both the tools and Repository Manager.

Since introducing AD/Cycle in September 1989, IBM has not indicated it would deliver more sooner, but it has avoided detailing what each piece of AD/Cycle would specifically do and when it would be capable of doing it. Observers said that left the door open for different interpretations and resulted in some industry confusion and heightened expectations for AD/Cycle capabilities during the past several months.

End of waste

The stated goal of AD/Cycle is to put an end to the costly and often wasteful programming procedures many shops are tangled up in. AD/Cycle is planned to eventually provide an integrated, consistent application development environment to replace current techniques. It will be made up of a core storage piece containing data on how to build applications and a slew of tools that hook into this core piece and share the information among them.

Some users contacted last week said they have no beef with the long-term product rollout plans. Adding that they expect it will take them years to move to a new, integrated application development environment anyway. However, these users, as well as some analysts, also said that IBM could better explain what it will be delivering to help them plan and to clear up any industry confusion or unreal expectations.

> "I REALLY DON'T need anything from IBM as a product today."
>
> TERRY LOWDER
> BANC ONE SERVICES CORP.

"I really don't need anything from IBM as a product today," said Terry Lowder, vice-president of technology research at Banc One Services Corp., a subsidiary of Banc One Corp. "What I need is a clean definition of what will be there and where the vendors can move to. I wasn't looking for anything to install in June and start doing things with."

Florida Power & Light Co. in Miami is another user site with a distance to go before it moves to a full-blown integrated development environment.

"I would say we are closely watching how it is progressing and are putting together AD/Cycle implementation plans," said Al Horner, manager of information planning at Florida Power & Light.

Still growing

IBM maintained that the pieces of AD/Cycle continue to be developed, which makes it difficult to define. For example, work on the information model piece of Repository Manager was under way at the time of the AD/Cycle announcement and will continue well into next year.

"We didn't say [AD/Cycle] existed, but we said we were in the process of putting it together and it would be evolutionary," said Earl Wheeler, an IBM vice-president and general manager of systems programming.

Wheeler said it has long been the plan to first release the AD/Cycle tools from IBM and third parties, to follow that with the initial release of Repository Manager and the information model and then move to an integrated environment in 1991. Meanwhile, Repository Manager and the information model will continue to be added to.

A CASE study

Repository Manager is the essence of AD/Cycle in that it provides the guidelines and tool integration that are intended to make application development easier for users.

However, it is not an end-user product.

The actual users of Repository Manager and its critical information model — which contains the definitions and guidelines for development — will be the computer-aided software engineering tools. The tools will interact with this AD/Cycle software and eventually swap information with one another.

The end user will run the tools, which in effect will consult Repository Manager to make sure the applications they design comply with the AD/Cycle guidelines. Repository Manager will hold this information in a DB2 database.

However, the initial Repository Manager will not have all the integration and other repository services, nor will it have a full information model to make this happen.

AD/Cycle

According to Steve Uhlir, manager of platform architecture in IBM's AD/Cycle strategy and architecture group, the initial release of Repository Manager will contain at least basic levels of services and an information model with a "very narrow initial focus."

"The basic purpose [of Repository Manager] is to be the central store for an enterprise for their definitional information," Uhlir said. "The ability of the Repository Manager first release to accomplish that is affected by its function and the scope of the information model. You need access functions, data interface functions and an information model definition that supports all that . . . In the first release, the information model will be more of a limiting factor than the interfaces."

According to Paul Hessinger, vice-president of technology and research at Computer Task Group, Inc. in Buffalo, N.Y., the information model is "still fairly skeletal," and Repository Manager will not have complete tool and object services.

An IBM spokesman said last week that IBM executives did not specify the exact functionality of this Repository Manager release when it was announced last September.

The IBM customer letter concerning Repository Manager/MVS Version 1, Release 1, sent out in September 1989, discusses it in concept and then states the first release will include: MVS/XA and MVS/ESA implementations of the Repository Interface of the Systems Application Architecture Common Programming Interface; an entity-relationship tool interface; object services tools interface; and an entity-relationship model, information views and polices, which has become known as the information model.

Of these features, an IBM spokesman said, "I understand they will continue to be enhanced. The basis of them will be shipped in June. I don't think we said those four would be definite and absolute on the date of availability."

ROSEMARY HAMILTON

Stratus clears recertification air

BY MARYFRAN JOHNSON
CW STAFF

MARLBORO, Mass. — Stratus Computer, Inc. last week announced its first formal policy covering maintenance of used equipment, ending two months of speculation and unease among computer leasing companies and customers.

Stratus executives acknowledged that some of the information that their salespeople used to fuel earlier speculation was "clearly out of bounds" from what the company intended.

"We got to our salespeople and sprayed a little cold water on them," said William Elliot, vice-president of market planning.

"We got into a situation where we didn't have a policy . . . and a few very aggressive computer salespeople were attempting to sell new equipment into accounts that were considering used equipment," he added.

The new Stratus recertification policy, which falls in line with standard industry practices, extends maintenance coverage to used machines — without additional charges to users — as long as the equipment has been under maintenance contract within 60 days of arriving at the new customer's workplace.

"This looks like a reasonable policy on the cover," said Chris Duncan, president of Regal Computer Solutions in La Mirada, Calif., which leases both Stratus and IBM System/88 computer systems.

Duncan noted that a 90-day grace period for a maintenance contract lapse would be more workable for resellers "because it's a slow market" for fault-tolerant systems. Tandem Computers, Inc.'s policy, for example, allows 90 days.

Red herring

Two months ago, Stratus sent a spasm of alarm through the leasing industry when a handful of overzealous Stratus sales representatives told several customers about a restrictive new policy regarding the maintenance of used equipment.

Trouble was, the policy did not exist.

The exorbitant fees quoted to some customers — charges that lessors warned would kill the market for used Stratus machines — were mostly wishful thinking on the part of salespeople intent on protecting their turf, Elliot said.

Among the fictitious fees detailed to some customers was a $50,000 license charge for the VOS operating system software, which users must buy separately from Stratus when they buy hardware from resellers.

Reality check

The actual charge for VOS licensing, however, will be a maximum of $12,000, Elliot said, with a monthly maintenance fee of about $120 for a high-end machine. Operating system software for the smaller Stratus models can run as low as $2,000, he added.

In cases where the maintenance contract on a used machine has been expired for longer than 60 days, Stratus will charge a minimum inspection fee of $600 under the new policy. Customers who want Stratus to install the machine will pay a minimum of $1,500 for time and materials.

Stratus is also re-examining its repair and upgrade prices, mindful of its monopoly position in servicing its own equipment, according to Elliot.

"We want to be fair to everybody concerned."

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TRENDS

SMALL IBM 370s

Estimated residual values of selected IBM processors
(figures supplied by Computer Economics, Inc.)

Residual value

(in thousands)

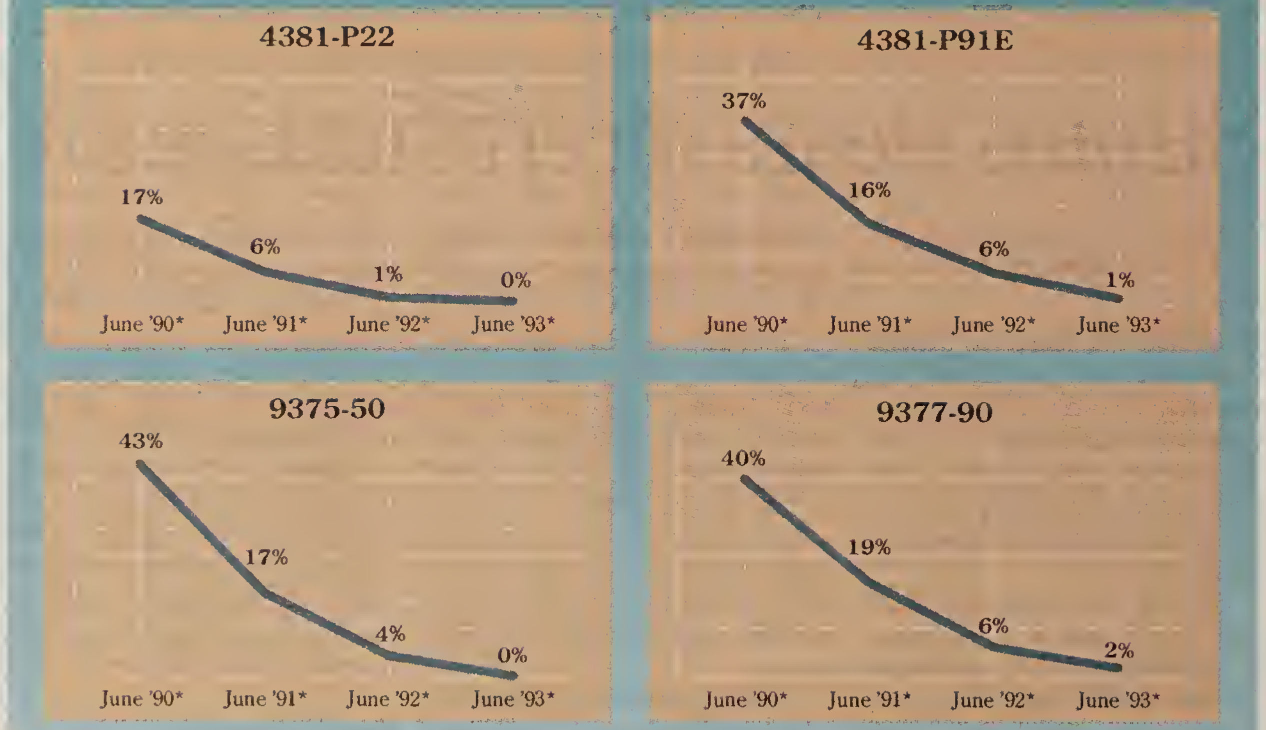
Replacement models for both system classes, which are due to be introduced this summer, will knock most models down to scrap value within three years

Model	List price (in thousands)	June '90*	June '91*	June '92*	June '93*
4381-P22	$322.3	$54	$20	$4.5	$0
4381-R24	$1,052	$340	$144.1	$54.7	$11.6
4381-P91E	$512.6	$190	$81	$29.7	$6.2
9375-50	$77.5	$33	$12.8	$3.1	$0
9377-90	$239.4	$95	$46.2	$15.3	$3.8

*Projected

Value as a percent of list price

Another reason behind these rapidly declining values is the general trend toward more compact systems like the Application System/400 or toward local-area networks



*Projected

Source: Computer Economics, Carlsbad, Calif.

CW Chart: Tom Monahan

NEXT WEEK

It took a long time for information systems to get off the ground at Midway Airlines, which didn't even have an IS department until 1987. That has all changed under IS director **Robert Kohlstedt** (right) and Vice-President of IS Paul Tate. Manager's Journal takes a look at the newfound role of technology in Midway's rapid growth.

Ralf-Finn Hestoft

Which mainframe access-control product most effectively meets users' needs? Find out in Buyers' Scorecard. The market-leading products are compared across 16 criteria, and a user survey reveals how much security these products supply. Buyers' Scorecard provides insight into what the users think and an assessment of their satisfaction.

INSIDE LINES

Chance at the top

Oracle user group presidents are planning their own summit meeting for mid-June. That's when about 10 of them will have a day-long powwow with Oracle Chief Executive Officer Larry Ellison and other top executives. Their mission is to refine new maintenance and pricing policies for Oracle sites from coast to coast. The meeting is being held in response to user complaints about uneven support levels — and about being forced into costly hardware upgrades to support the new Oracle Version 6.0 database management system.

Babel-ing of towers

Boy, these computer projects can be so complicated. Novell, which you would think could foresee these kinds of things, has been bogged down in its attempt to produce a local-area network naming service for its Netware line. Novell engineers are having a hard time figuring out how to add new servers to LANs with prototype naming services. Seems all names are encrypted — even the LAN itself can't know the codes to share the names with the new server.

Underdeveloped

Eastman Kodak has shelved plans to outsource its centralized applications development — at least for now. The firm had been considering Computer Task Group, Andersen Consulting and/or Keane to take over some development pieces. Meanwhile, efforts to distribute more applications work to business units have hit a political snag — unit managers do not want the additional expense.

Et tu, Willy? Part XXVI

"I can't believe he is saying that," said one industry executive as Microsoft Chairman Bill Gates twisted the knife in the back of supposed ally Hewlett-Packard during the introduction of Windows 3.0. Asked whether Microsoft would jointly market HP's Windows-based New Wave environment, Gates noted that it is not a Microsoft product and suggested it would be up to HP to talk about its plans for New Wave. "In a weak sense, we compete with them for ISV time. [However,] I expect the majority of Windows systems *will not* run New Wave but rather [just] the good ol' Windows [applications]."

Presenting credentials

A hitherto-obscure company called Coordination Technology plans to announce what may be the first groupware for OS/2 systems at the PC Expo show June 18 in New York. What makes the announcement interesting is that the company's founders include a former Ashton-Tate executive and a long-time IBMer, while its partners include Arthur Andersen and one of the regional Bell holding companies. The software is said to facilitate work-group cooperation by providing interactive ties across both local- and wide-area networks.

Merger manic mumblings

In the wake of speculation that Lotus will take another look at Ashton-Tate and reports that AT&T — among others — is looking at Novell comes another report that Novell first approached Microsoft with its merger offer. Negotiations actually took place before fizzling out, a source said.

Clocking up access time

So many people flooded Novell's Netwire service on Compuserve seeking to download Novell's new extended and expanded memory shells that the four files had to be moved into their own section. A Compuserve source said more than 1,500 downloads had been recorded since the files became available May 23. The shells will free up network memory for Windows.

Mikhail Gorbachev seems as anxious to hook up with U.S. computer manufacturers as they are to hook up with him. Among those scheduled to lunch with the Soviet president on his trip through Silicon Valley and the San Francisco Bay Area Monday are Apple Chief Executive Officer John Sculley, HP co-founder William Hewlett, Tandem Computers President James Treybig and Oracle's Ellison. If you feel left out, dial into our hot line and exchange intelligence. Contact News Editor Pete Bartolik at 800-343-6474, send a fax to 508-875-8931 or message COMPUTERWORLD *on MCIMail.*

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